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JOURNAL OF THE ROYAL HORTICULTURAL SOCIETY

Vol. LXV



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IARI

CONTENTS

	PAGE
Calendar, 1940	1
The Secretary's Page	5
The Vegetable Garden in January	7
Chelsea Physic Garden. By G. W. Robinson	8
Hogg and Emmerton on the Auricula. By T. Hay, C.V.O., V.M.H.	13
The Genus Streptocarpus. By W. J. C. Lawrence	17
Ground Cover. By Fred Stoker, F.L.S., V.M.H.	23
Awards to Plants in 1939	27
Different Ways of Cooking Winter Vegetables. By Lady Hall	28
Early-Flowering Chrysanthemums at Wisley	33
Book Reviews	41

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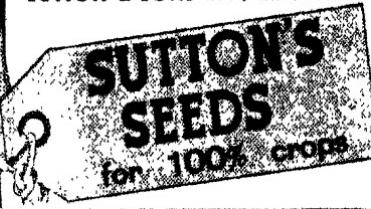
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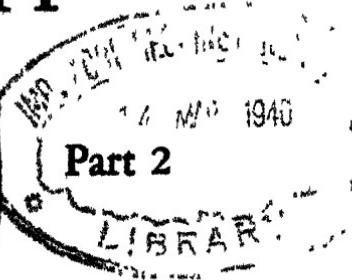
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Vol. LXV



CONTENTS

	PAGE
The Secretary's Page	43
The Kitchen Garden in February	48
A Few Herbaceous Plants Recently Introduced to Gardens. By R. L. Harrow, V.M.H.	50
Plants to Keep in Mind:	
Dracocephalum Stewartianum. By G. H. Preston	52
Garden Making from Old Pasture. By Sir A. D. Hall	53
Some Tibetan Rosa Species collected by Capt. Kingdon Ward, 1924. By B. O. Mulligan, N.D.H.	56
The Award of Garden Merit—LII	60
Garden Notes: Delphinium Wellbyi	61
Book Reviews	62
Extracts from Proceedings: Annual Report for 1939, i; Accounts for 1939, x.	

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JOURNAL OF THE ROYAL HORTICULTURAL SOCIETY

Vol. LXV

Part 3



CONTENTS

	PAGE
The Secretary's Page	63
Wisley in March	66
The Kitchen Garden in March	69
Features of My Garden.—I. Magnolias at Bodnant. By The Lord Aberconway	71
Garden Notes : The Nomenclature of the Genus Phylodoce	74
Compost-Making for Gardens. By Sir D. Hall	75
The Royal Botanic Garden, Edinburgh. By J. Macqueen Cowan. <i>Illustrated</i>	77
In the Lindley Library.—I. Pansies of Yesterday. By R E Hay. <i>Illustrated</i>	84
Lessons from the Wisley Fruit Trials.—I. By J. M. S Potter. <i>Illustrated</i>	85
New Rhododendron Hybrids	88
Furnishing a New Garden. By J. Coutts	89
Poultry Food from the Garden	96
The Award of Garden Merit.—LIII. <i>Illustrated</i>	97
Trials at Wisley, 1939 : Late Culinary Peas ; Brussels Sprouts ; Scarlet Runner Beans	98
Book Reviews	101

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JOURNAL OF THE ROYAL HORTICULTURAL SOCIETY

Vol. LXV



Part 4

CONTENTS

	PAGE
The Secretary's Page	101
Wisley in April	106
The Kitchen Garden in April	109
Features of My Garden.—II. The Home Wood at Exbury. By Lionel de Rothschild	111
Extracts from Proceedings, xxiii; Annual General Meeting, xxiv; General Meetings, xxxiv; Donations to Wisley, xxxvii	113
In the Lindley Library.—II. An Early Book on Succulent Plants. By Vera Higgins. <i>Illustrated</i>	115
The Glazed Frost of January 1940. By Sir A. D. Hall. <i>Illustrated</i>	118
Some Plants in the Show	119
Docynia Delavayi. By B. O. Mulligan. <i>Illustrated</i>	120
Awards to Plants in 1940	122
Award of Garden Merit.—LIV. <i>Illustrated</i>	123
Trial of Haricot Beans	123
Book Reviews	126

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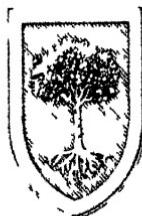
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JOURNAL OF THE ROYAL HORTICULTURAL SOCIETY

Vol. LXV

Part 5



CONTENTS

	PAGE
The Secretary's Page	127
Wisley in May. <i>Illustrated</i>	130
The Kitchen Garden in May	133
Plants to Come. By F. Kingdon Ward. <i>Illustrated</i>	135
The Herb Garden. By Lady Hall	142
Food from the Garden. By Dr. H. V. Taylor	146
Daphne Sophia. By T. Hay	150
Awards to Plants in 1940	151
In the Lindley Library.—III. An Early Book on Alpine Plants. By R. E. Hay	153
Some Plants in the Show	155
Book Reviews	156
Extracts from Proceedings: General Meetings, XXXIX.	

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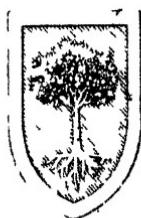
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JOURNAL OF THE ROYAL HORTICULTURAL SOCIETY

Vol LXV

Part 7



CONTENTS

	PAGE
The Secretary's Page	195
Wisley in July. <i>Illustrated</i>	198
The Kitchen Garden in July	201
Features of My Garden.—IV. Nymans. By Lt.-Col. L. C. R. Messel	203
Orphanidesia gaultherioides. By Dr. Fred Stoker. <i>Illustrated</i>	210
Masters Memorial Lecture. Graft Hybrids and Chimaeras.—I. By Prof. F. E. Weiss <i>Illustrated</i>	212
Plants to Keep in Mind: Camellia saluenensis C. japonica. By The Lord Aberconway. <i>Illustrated</i>	217
Some Plants in the Show	218
Awards to Plants in 1940	219
Trials at Wisley	223
Extracts from Proceedings. General Meetings, li.	

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JOURNAL OF THE ROYAL HORTICULTURAL SOCIETY

Vol. LXV

Part 8



CONTENTS

	PAGE
The Secretary's Page	227
Wisley in August	230
The Kitchen Garden in August	233
Dryas or Mountain Avens. By G. H. Preston .	234
Masters Memorial Lecture. Graft Hybrids and Chimaeras.—II. By Prof. F. E. Weiss. <i>Illustrated</i>	237
The Tomato and the Cigarette. By Kenneth M. Smith. <i>Illustrated</i>	243
The Water Garden. By Frances Perry. <i>Illus-</i> <i>trated</i>	245
Preserving Vegetables. By Alice Crang .	250
Some Plants in the Show	252
Rosa macrophylla var. Korolkowi. By B. O. Mulligan. <i>Illustrated</i>	254
Lessons from the Wisley Fruit Trials.—III. Yellow Edge of Strawberries. By J. M. S. Potter	256
Trials at Wisley : Bearded Irises	261
Book Reviews	264

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JOURNAL OF THE ROYAL HORTICULTURAL SOCIETY

Vol. LXV

Part 9



CONTENTS

	PAGE
The Secretary's Page	267
Wisley in September	270
The Kitchen Garden in September	273
Books in the Red Cross Sale. By T. Hay	275
Plants in the Red Cross Sale. By The Assistant Secretary	276
The Cabbage White Butterfly. By G. Fox- Wilson. <i>Illustrated</i>	278
Berberis chrysosphaera: a New Species from Tibet. By B. O. Mulligan. <i>Illustrated</i>	281
How the Plant Breeder goes to Work: I. By Sir Daniel Hall. <i>Illustrated</i>	283
Expedition to the Andes, 1938-1939. By E. K. Balls. <i>Illustrated</i>	289
Experiences with some Wall Shrubs and Climbers. By C. S. Orwin	296
Seale-Hayne Agricultural College	301
Awards to Plants in 1940	304
A Floral Clock. By John R. Baker. <i>Illustrated</i>	306
Book Reviews	310

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JOURNAL OF THE ROYAL HORTICULTURAL SOCIETY

Vol. LXV

Part 10



CONTENTS

	PAGE
The Secretary's Page	311
Wisley in October	314
The Kitchen Garden in October	317
Gaultheria <i>yunnanensis</i> . By Dr. Fred Stoker. <i>Illustrated</i>	319
Seed and Food in War-time. By M. B. Crane. <i>Illustrated</i>	321
Garden Notes	326
How the Plant Breeder goes to Work : II. By Sir Daniel Hall. <i>Illustrated</i>	327
The First Record of Plant Introduction. By R. E. Cooper. <i>Illustrated</i>	334
Awards to Plants in 1940	337
Why "Jerusalem Artichoke"?—I. By Red- cliffe N. Salaman	338
The Botanic Gardens, Glasnevin, Dublin. By J. W. Besant. <i>Illustrated</i>	349
Plants to keep in Mind: Chrysanthemum (Leucanthemum) <i>demnatense</i> . By B. O. Mulligan. <i>Illustrated</i>	353
Book Reviews	354

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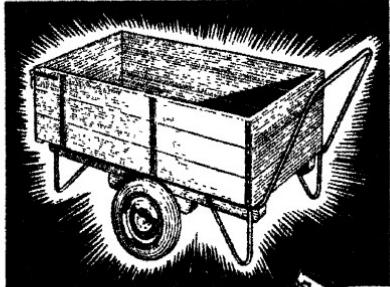
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JOURNAL OF THE ROYAL HORTICULTURAL SOCIETY

Vol. LXV

Part 11



CONTENTS

	PAGE
The Secretary's Page	355
Wisley in November	357
The Kitchen Garden in November	359
Spray Calendar	361
Tall Bearded Irises of Yesterday and To-day. By B. R. Long	363
Why "Jerusalem" Artichoke?—II. By Redcliffe N. Salaman. <i>Illustrated</i>	376
In the Lindley Library.—IV. Samuel Gilbert and his Florist's <i>Vade-Mecum</i> . By Dr. Fred Stoker. <i>Illustrated</i>	384
Rosa Ernestii. By F. C. Stern. <i>Illustrated</i>	387
The Garden Hydrangeas. By Michael Haworth-Booth. <i>Illustrated</i>	388
Chiswick Gardens. By C. H. Curtis	391
Garden Notes: Paeonia Lemoinei 'L'Esperance.' <i>Illustrated</i>	398

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JOURNAL OF THE ROYAL HORTICULTURAL SOCIETY

Vol. LXV

Part I



January 1940

CALENDAR, 1940.

MEETINGS of the Society are usually held, with few exceptions, on alternate Tuesdays throughout the year accompanied on each occasion by a two-day Show of plants flowers etc Owing to the War, however, this programme of Meetings and Shows will commence on February 20, the date of the Annual Meeting. It has been arranged with the kindred Societies that special features of their particular flowers will be made on the appropriate dates. Particulars of the Lectures and Talks on plants in the Shows will be published on "The Secretary's Page" in the JOURNAL. The Rules and Regulations relating to the Society's Shows, together with the list of Committees and times at which they will meet, are published in a separate pamphlet copies of which are obtainable on application to the Secretary. All Meetings will be held in the Society's Halls. Fellows tickets admit to all the Shows mentioned in this Calendar.

	Time
January	
11	*Demonstration at Wisley (weather permitting): Treatment of Soil—Digging and Trenching; Application of Manures II A.M.—I P.M.
12	*Second day of Demonstration II A.M.—I P.M.
15	Entries for General Examination close.
February	
1	Entries for National Diploma in Horticulture Examinations close.
20	Fortnightly Meeting. Flowers in season 12 NOON—6 P.M. ANNUAL GENERAL MEETING 3 P.M.
21	Second day of Meeting 10 A.M.—5 P.M. Talk on some plants in the Show (Lecture Room) 3 P.M.
March	
5	Fortnightly Meeting. Flowers in season 12 NOON—6 P.M. Lecture 3 P.M.
6	Second day of Meeting 10 A.M.—5 P.M. Talk on some plants in the Show (Lecture Room) 3 P.M. *Demonstration at Wisley (weather permitting).
7	Seed Sowing—Indoors and Outdoors 2—4 P.M. *Second day of Demonstration 2—4 P.M. General Examination in Horticulture (Seniors and Juniors).

* Fellows wishing to attend these Demonstrations should inform the Director, R.H.S. Gardens, Wisley, Ripley, Surrey, beforehand, mentioning the day.

2 JOURNAL OF THE ROYAL HORTICULTURAL SOCIETY.

March		Time.
14	*Demonstration at Wisley (weather permitting) : Rose Pruning and Pruning of Shrubs	2-4 P.M.
15	*Second day of Demonstration	2-4 P.M.
16	Teachers' Examination in School and Cottage Gardening.	
19	Fortnightly Meeting. Flowers in season. Special Feature : Alpines	12 NOON-6 P.M. 3 P.M.
20	Lecture	10 A.M.-5 P.M. 3 P.M.
	Second day of Meeting. Special Feature : Alpines Talk on some plants in the Show (Lecture Room)	
April		
2	Fortnightly Meeting. Flowers in Season. Special Feature : Perpetual-flowering Carnations Sewell Medal Competitions for Alpine and Rock-Garden Plants for Amateurs and Horti- cultural Traders.	12 NOON-6 P.M.
	Masters Memorial Lecture—I, by Professor F. E. Weiss, D.Sc., F.R.S., on "Graft Hybrids and Chimaeras"	3 P.M.
8	Second day of Meeting. Special Feature : Perpetual- flowering Carnations	10 A.M.-5 P.M.
	Lecture, arranged by the Institute of Landscape Architects	3 P.M.
	*Demonstration at Wisley (weather permitting) : Spring Spraying of Fruit Trees	2-4 P.M.
4	*Second day of Demonstration	2-4 P.M.
8	Entries for Daffodil Show close.	2-4 P.M.
16	Fortnightly Meeting. Daffodil Show and Flowers in season	12 NOON-6 P.M.
	Daffodil Competition for Amateurs.	
	Masters Memorial Lecture—II, by Professor F. E. Weiss, D.Sc., F.R.S., on "Graft Hybrids and Chimaeras"	3 P.M.
17	Second day of Meeting and Daffodil Show	10 A.M.-5 P.M.
	Talk on some plants in the Show (Lecture Room)	3 P.M.
	*Demonstration at Wisley (weather permitting) : Control of Vegetable Pests and Diseases	2-4 P.M.
18	*Second day of Demonstration	2-4 P.M.
27	National Diploma in Horticulture. Written Examination.	
30	Fortnightly Meeting. Flowers in season. Special Features : Rhododendrons and Auriculas Flowering Tree and Shrub Competition for Amateurs.	12 NOON-6 P.M.
	Lecture	3 P.M.
	Lily Group Meeting (Restaurant, Old Hall)	4 P.M.
May		
1	Second day of Meeting. Special Features : Rhodo- dendrons and Auriculas	10 A.M.-5 P.M.
	Talk on some plants in the Show (Lecture Room)	3 P.M.
	Entries close for the examination for the National Certificate in Elementary Horticultural Practice.	
	No CHELSEA SHOW.	
21	Fortnightly Meeting. Flowers in season.	12 NOON-6 P.M.
	Sewell Medal Competitions for Alpine and Rock-Garden Plants for Amateurs and Horti- cultural Traders.	
	Lecture	3 P.M.
22	Second day of Meeting	10 A.M.-5 P.M.
	Talk on some plants in the Show (Lecture Room)	3 P.M.
June		
4	Fortnightly Meeting. Flowers in Season. Special Feature : Irises	12 NOON-6 P.M.
	Iris Discussion	3 P.M.

* Fellows wishing to attend these Demonstrations should inform the Director,
R.H.S. Gardens, Wisley, Surrey, beforehand, mentioning the day.

		Time.
June		
5	Second day of Meeting. Special Feature: Irises *Demonstration at Wisley (weather permitting): Summer Pruning of Shrubs Talk on some plants in the Show (Lecture Room)	10 A.M.-5 P.M. 2-4 P.M. 3 P.M. 2-4 P.M.
6	*Second day of Demonstration Teachers' Advanced Practical Examination at Wisley.	
10-14	National Diploma in Horticulture. Preliminary Practical Examinations at Wisley.	
17-21	National Diploma in Horticulture. Final Practical Examinations at Wisley.	
18	Fortnightly Meeting. Flowers in season. Special Features: Cacti and Succulents, Violas and Pansies Flowering Tree and Shrub Competitions for Amateurs. Lecture	12 NOON-6 P.M. 3 P.M. 4 P.M.
19	Lily Group Meeting (Restaurant, Old Hall) Second day of Meeting. Special Features: Cacti and Succulents, Violas and Pansies Lecture arranged by Institute of Landscape Architects	10 A.M.-5 P.M. 3 P.M.
July		
2	Fortnightly Meeting. Flowers in season. Special Features: Lilies, Delphiniums and Sweet Peas Lily Competitions for Amateurs.	12 NOON-6 P.M.
8	Second day of Meeting. Special Features: Lilies, Delphiniums and Sweet Peas Talk on some plants in the Show (Lecture Room)	10 A.M.-5 P.M. 3 P.M.
16	Lily Group Visit to Royal Botanic Gardens, Kew. Fortnightly Meeting. Flowers in season. Special Feature: Border Carnations Lily Competitions for Amateurs. Clay Cup Competition for new Scented Rose for Amateurs and Horticultural Traders. Lily Group Discussion on the Lilies exhibited (Lecture Room, New Hall)	12 NOON-6 P.M. 3 P.M.
17	Second day of Meeting. Special Feature: Border Carnations Talk on some plants in the Show (Lecture Room)	10 A.M.-5 P.M. 3 P.M.
18	*Demonstration at Wisley (weather permitting): Summer Pruning of Fruit Trees	2-4 P.M. 2-4 P.M.
30	Second day of Demonstration Fortnightly Meeting. Flowers in season	12 NOON-6 P.M. 3 P.M.
31	Lecture Second day of Meeting Talk on some plants in the Show (Lecture Room)	10 A.M.-5 P.M. 3 P.M.
August		
13	Fortnightly Meeting. Flowers in Season. Special Feature: Gladioli Foremarke Cup and other Gladiolus Competitions for Amateurs and Horticultural Traders. Talk on some plants in the Show (Lecture Room)	12 NOON-6 P.M. 3 P.M.
14	Second day of Meeting. Special Feature: Gladioli	10 A.M.-5 P.M.
21	*Demonstration at Wisley (weather permitting): Vegetative Propagation of Plants	2-4 P.M. 2-4 P.M.
22	*Second day of Demonstration	12 NOON-6 P.M.
27	Fortnightly Meeting. Flowers in season Talk on some plants in the Show (Lecture Room)	3 P.M.
28	Second day of Meeting	10 A.M.-5 P.M.
September		
10	Fortnightly Meeting. Flowers in season. Special Feature: Dahlias Competition for Cacti and Succulents. Lecture	12 NOON-6 P.M. 3 P.M.

* Fellows wishing to attend these Demonstrations should inform the Director, R.H.S. Gardens, Wisley, Ripley, Surrey, beforehand, mentioning the day.

4 JOURNAL OF THE ROYAL HORTICULTURAL SOCIETY.

		Time.
September		
11	Second day of Meeting. Special Feature: Dahlias Talk on some plants in the Show (Lecture Room)	10 A.M.-5 P.M. 3 P.M.
24	Fortnightly Meeting. Flowers in Season. Special Feature: Early-flowering Chrysanthemums Lecture	12 NOON-6 P.M. 3 P.M. 4 P.M.
25	Second day of Meeting. Special Feature: Early- flowering Chrysanthemums Talk on some plants in the Show (Lecture Room)	10 A.M.-5 P.M. 3 P.M.
October		
8	Fortnightly Show. Fruit and Vegetable Show and Flowers in Season Fruit and Vegetable Competitions for Amateurs and Horticultural Traders. (See special schedule.)	12 NOON-6 P.M.
9	Lecture	3 P.M.
	Second day of Meeting	10 A.M.-4 P.M.
	Talk on some plants in the Show (Lecture Room)	3 P.M.
22	Fortnightly Meeting. Flowers in season Orchid Cup Competition for Amateurs.	12 NOON-5 P.M.
	Lecture	3 P.M.
23	Second day of Meeting	10 A.M.-4 P.M.
November		
5	Fortnightly Meeting. Flowers in season. Special Feature: Chrysanthemums Flower Arrangement Competition for Amateurs.	12 NOON-4 P.M.
	Lecture	3 P.M.
6	*Demonstration at Wisley (weather permitting): Planting Fruit Trees and Roses	2-4 P.M. 2-4 P.M.
7	*Second day of Demonstration	12 NOON-4 P.M.
26	Fortnightly Meeting. Flowers in season Lecture	3 P.M.
December		
4	*Demonstration at Wisley (weather permitting): Pruning of Fruit Trees	11 A.M.-1 P.M.
5	*Second day of Demonstration	11 A.M.-1 P.M.
10	Fortnightly Meeting. Flowers in season.	12 NOON-4 P.M.

* Fellows wishing to attend these Demonstrations should inform the Director, R.H.S. Gardens, Wisley, Ripley, Surrey, beforehand, mentioning the day.

THE SECRETARY'S PAGE.

IN spite of the inconveniences and difficulties of war-time the Council believes that the programme of events given in the Calendar (pp. 1-4) will prove attractive, and will meet with the wishes of the Fellows.

The first show of the war, which took place on October 24 and 25, was a great success, as will be seen from the photograph reproduced in fig. 8. Not only were the exhibits large, beautiful and numerous, but there was the added attraction of meeting old friends and exchanging news. Indeed, the attendance was remarkable and proved that the Fellows welcomed the opportunity of forgetting their war-time worries amid the happier surroundings of the show.

This programme, attractive as it is, can only be carried out if the Fellows and Associates will support the Society; they are reminded that the annual subscriptions to the Society are due on January 1, and a ready response is looked forward to.

The January JOURNAL has been altered in its character, and the list of Committees, times and meetings, rules and regulations, etc., formerly published in the January JOURNAL, will be issued separately and not generally distributed. These particulars will be available on application.

The proceedings of the Society with all its activities sometimes call for lengthy reports, but it is hoped, especially during the war-time, to condense these to such a length that the utility of the JOURNAL from a more practical horticultural point of view may be developed.

LOCAL HORTICULTURAL SOCIETIES.

The Minister of Agriculture has on more than one occasion broadcast upon the valuable contribution to the food supplies that can be made through the development of gardens and allotments. This development calls for the formation of horticultural societies through which information, by means of lectures, shows, etc., can be promulgated. It is hoped that Fellows and Associates will do their best to help in the inauguration of such societies. Particulars of how to form such a society may be had on application to the Secretary.

AFFILIATED SOCIETIES IN WAR-TIME.

There are a great number of affiliated societies, and it is important that these societies should maintain their activities, even more so than in peace time. The Council desires to encourage such societies, and, for this purpose, has decided to present to each affiliated society a Knightian Medal to be offered for award in 1940 to the member having the best cultivated garden or allotment, judged by a scale of points which has been prepared to give special consideration to food production.

JOURNAL OF THE ROYAL HORTICULTURAL SOCIETY.

The Secretary is prepared to help any society in drafting its schedule to incorporate the offer of this medal.

While the increase of the growth of vegetables is being especially pressed, it is very undesirable that the ornamental side of gardening should be neglected. Without flowers life would be sad.

FRUIT TREE PLANTING IN PRIVATE GARDENS.

The Ministry of Agriculture has issued the following announcement :—

In the endeavour to increase the staple food crops during wartime it has been necessary to concentrate in the open fields on such crops as cereals and Potatos, and to discourage the use of fresh land for trees, unless they are planted amongst the food crops. This does not mean, however, that the Ministry of Agriculture deprecates the planting of fruit trees generally. In private gardens fruit trees and bushes are usually planted in the kitchen garden and it is hoped that the normal planting will still continue. The nursery trade has ample stocks of trees and bushes. The majority of gardeners can grow much of their own fruit without any appreciable loss of ground for vegetables and flowers ; and no fruit is quite like that picked fresh from one's own fruit tree. It is hoped that private gardeners will still plant their normal supplies of fruit trees and bushes during the war period, bearing in mind that crops should be planted between the trees.

BETTER FRUIT DISEASE CONTROL IN PRIVATE GARDENS.

Through the kindness of the Ministry of Agriculture a leaflet "Better Fruit Disease Control in Private Gardens" was circulated with the December JOURNAL and should be of great assistance to all who grow fruits, as it describes quite clearly the principles of disease control.

Further copies of this leaflet are obtainable on application to the Ministry direct or to the Secretary.

CALENDAR.

The regular shows will commence on February 20, the day of the Annual Meeting. It has been impossible to include the titles of the lectures and names of lecturers owing to the difficulties of making the full arrangements late in the year. Advance particulars, however, of the lectures will be found on this page in the JOURNAL.

At the shows themselves, in co-operation with the Kindred Societies affiliated to this Society, special features will be made on the appropriate days of the Kindred Society's flower, and by these means it is hoped to maintain the whole of the machinery of the flower shows held in the Society's Halls.

THE VEGETABLE GARDEN IN JANUARY.

IN most parts of the country the rainfall of the past few months has been above the average, and there have been many days when work on the land has been out of the question. The thought that is uppermost in the minds of all gardeners at the moment is to push on with the digging programme and try to make up lost time if possible.

As clearing and digging the ground proceeds, waste vegetable matter should be placed on the compost heap. At this time, when we are all trying to accustom ourselves to a new routine, it would be a real step forward if all gardeners could acquire the compost heap habit, for the compost heap fulfils just as important a function in good gardening as the *pot au feu* plays in French cooking.

Assistance to growing crops, principally of Cabbages and allied vegetables—by means of hoeing when weather and soil conditions permit—will improve their quality, aerate the ground and destroy weeds. The Celery season, too, may be extended by protecting the plants during spells of severe frost with dry straw or bracken. Fold over the leaves to protect the curds of Broccoli, or, in very exposed districts, “heel” the whole plant over towards the north.

The age-old advice to order seeds early in January may be even more timely this year than usual, for, although there is not likely to be a shortage of vegetable seeds in general, it is only the early purchaser who can hope to obtain supplies of his favourite varieties. Recommended varieties of Peas and Broad Beans may be sown towards the end of January in pots or boxes and placed in cold frames ready for planting out at a later date. If hotbeds have been prepared beneath frames, Carrots and Radishes may be sown in them towards the end of the month. For large Onions, or if it is known that attacks from onion fly are to be feared, early sowings under glass are essential. Seeds sown during the middle of January will provide good young Onions for planting out in April. Rhubarb and Seakale should be lifted during this month for forcing under the staging of a greenhouse, or plants may be “forwarded” in the open by placing pots or tubs over them and covering these with manure. It is important, however, to commence this work early in the year. A few roots of Mint should also be boxed and taken into a greenhouse or frame for early supplies.

Potatos for the early crop may be stood out in trays to “sprout,” and those still in store to provide supplies for the household should be inspected and any growths rubbed off them.

In the greenhouse, another sowing of Tomatos may be made; with the prospect of fewer meat dishes during the coming summer, it might be worth while growing a few of the golden yellow varieties of Tomato which provide a welcome touch of novelty to the vegetarian menu and are considered by many to be of superior flavour.

THE CHELSEA PHYSIC GARDEN.

By G. W. ROBINSON.

OVER a period of two and a half centuries the old Physic Garden has carried on its scientific and horticultural labours ; when it was walled in (in 1674) it was in the village of Chelsea which is shown in maps of that period as situated among fields and common land. The earliest record of the garden appears to be the grant of a lease of the present site to the Apothecaries' Company in 1673 from CHARLES (afterwards Lord) CHEYNE.

How many gardeners have tilled its soil and tended its plants ? And how many students have studied, in its early days, medicine and, in later times, botany—the science of plants ? Without doubt a great many ; and among them are names which will always retain their place in the history and development of horticulture, and in the gradual transition from herbs and "herborizing" to the modern study of botany.

Fortunately we have fairly detailed records of the Physic Garden over its whole existence.

A small book with the title " Memoirs Historical and Illustrative of the Botanick Garden at Chelsea, belonging to the Society of Apothecaries of London," is really a chronological record of the garden to the year 1820, compiled by a member of the Society of Apothecaries, HENRY FIELD.

A second edition was prepared in 1878 by Dr. R. H. SEMPLE which amplifies and continues the story to that date, and includes plans of the garden, and a catalogue of plants cultivated.

More recently the history of the garden has been written in a charming fashion by Dr. F. DAWTREY DREWITT in "The Romance of the Apothecaries' Garden at Chelsea."

Of the earliest gardeners little is known, but in 1680 Mr. JOHN WATTS was appointed "to have the care and management of the garden at £50 per annum and in 1681 a greenhouse or stove was erected in the Garden."

A few years later the diarist EVELYN wrote, "What was very ingenious was the subterraneous heat conveyed by a stove under the conservatory, all vaulted with brick, so as he has the doores and windowes open in the hardest frosts, secluding only the snow."

Two years later Dr. HERMAN of Leyden, a Professor of Botany, visited the garden and an exchange of plants was agreed on, Mr. WATTS visiting Holland the following year for the purpose.

This is interesting as it is probably the first authentic record of international exchange of botanical material, and the forerunner of the present system of seed collection and distribution throughout the

Botanic Institutions of the world. It was during the curatorship of Watts (in 1683) that the four Cedars of Lebanon were planted (Fig. 6); they are reputed to be the first planted in Britain and were certainly the first to produce cones, in 1732. The history of these trees is of interest and may be found in "Historical Gardens" by the Hon. Mrs. EVELYN CECIL (Lady ROCKLEY).

WATT's successor was SAMUEL DOODY, a botanist as well as an apothecary; he was evidently an authority on cryptogams, for FIELD says, "his knowledge of them was superior to any other person of his day."

In 1722 "the most famous Gardener of his day" PHILLIP MILLER was appointed, his Gardener's Dictionary was without doubt the standard work of its time, several editions were published and it was translated into several languages.

An event of considerable interest during MILLER's term of office was the visit of LINNAEUS (in 1736) to the garden.

The arrangement of the garden as shown by a catalogue drawn up by MILLER was based on the work of RAY and consisted simply of two sections: herbs and undershrubs (405) and trees and shrubs (94).

MILLER later became a disciple of LINNAEUS and adopted his system, which must have been used in the garden for almost a century. This great gardener remained Curator for forty-eight years; he died in 1771 at the age of eighty and was buried in Chelsea Old Church graveyard. A monument to his memory was erected by the Linnean Society and the Horticultural Society (now the R.H.S.) and this has quite recently been cleaned and renovated.

He was succeeded by one of his own pupils JAMES FORSYTH, who later became noted for his work on pruning and training "fruit and forest trees."

After thirteen years at Chelsea he was appointed Royal Gardener at Kensington Palace where he remained until his death in 1804. He is commemorated by the genus *Forsythia*.

Although he held office for a period of thirty years, little is recorded of the work of JOHN FAIRBAIRN who followed FORSYTH. During his curatorship, however, new stoves and tan pits were erected and water troughs lined with lead, for the cultivation of aquatics, were built. It is also on record that seeds and bulbs were being received from various parts of the world including Sierra Leone, Norfolk Island, the Cape of Good Hope, Madrid and Germany.

On FAIRBAIRN's death in 1814 WILLIAM ANDERSON was elected and a few years later he was highly praised for his skilful management and for the improvements which he carried out. One of his improvements, according to FIELD, was the "employment of sand as a medium of conveying heat to the plants, instead of tan bark"; he also says this "bids fair to become a permanent improvement as a means of producing a more equable diffusion of that heat, and at the same time causing a diminution of expense, both of them important desiderata in exotic gardening." ANDERSON was Curator for thirty-two years

and on his death in 1846 he was buried between the graves of Sir HANS SLOANE and PHILLIP MILLER at Chelsea Old Church.

By chance ROBERT FORTUNE had just returned from his first trip to China on behalf of the Horticultural Society of London and he was "elected to the office of Curator." At this time two new span-roofed glass structures, stove and greenhouses, were built and heated by the Polmaise or hot-air system. It apparently was not a success; for some years later it was converted to hot-water heating. Two years after his appointment the East India Company asked the Garden Committee to release FORTUNE so that he could undertake the importation of Tea into India.

He was succeeded by THOMAS MOORE in 1848, but from this date the garden fell on evil days and a few years later the greenhouses were cleared save for those plants which did not require artificial heat and one of them was sold. Labourers were dismissed and other drastic economies effected and the Herbarium was presented to the Trustees of the British Museum.

In 1863, however, there came a change of policy and an effort was made to revive the garden, then in a dilapidated condition. MOORE prepared an ambitious list of plants which it was proposed to cultivate, but it is doubtful if he ever obtained many of them, for the garden again fell on evil times.

He became an authority on hardy ferns for which his cold houses no doubt proved most suitable.

MOORE died in 1887 and six years later the Apothecaries approached the Charity Commission and asked to be relieved of their trust.

In February 1899 they handed over their old garden to the City Parochial Trustees who were to give it a new lease of life.

We have followed up the horticultural line of succession for a period of 200 years. Now what of the many eminent botanists and other learned gentlemen who were connected with the history and development of the garden?

The most important was of course Sir HANS SLOANE, who in 1722 conveyed the garden to the Apothecaries' Company, subject to certain clearly defined conditions. This deed of conveyance declares that the "said Garden may at all times thereafter be continued as a Physick Garden" . . . "That their apprentices and others may better distinguish good and useful plants from those that bear resemblance to them and yet are hurtful, and other the like good purposes."

The garden therefore was not to be used for the cultivation of drugs for commercial purposes, but to grow plants for comparison and study, and this policy has been preserved to the present day. In gratitude for his munificence a statue of Sir HANS SLOANE in marble, by MICHAEL RYSBRACH, was erected in 1737 and this still stands in the centre of the garden. Unfortunately, owing to war conditions, this very dignified monument is now obscured by protective covers and sand-bags!

For over a century there was a succession of botanists holding the

office of Director of the Garden and Demonstrator of Plants. The post was created in 1724 while MILLER was Curator, when ISAAC RAND, F.R.S., was appointed, his duties were to "visit the Garden often and take the superintending care and inspection of it" and to "attend in the garden at least twice in each month to demonstrate the plants" during the six summer months.

Apparently he and MILLER did not pull together very well, for both compiled and published independently Catalogues of the plants cultivated in the garden.

Another noted apothecary and botanist to hold this office was WILLIAM HUDSON, the author of *Flora Anglica*. He was one of the first botanical authors in Britain to use the Linnaean system.

He retired in 1771 and was succeeded by STANESBY ALCHORNE who though he may not have been an eminent botanist, certainly has the credit of building one of the earliest Rock Gardens in Britain.

FIELD says, "The same Gentleman presented about 40 tons of old stones, brought from the Tower of London, for the purpose of raising an artificial rock, to cultivate these plants which delight in such a soil: to which was afterwards added flints and chalk; and also a large quantity of lava from a volcano in Iceland presented by Sir JOSEPH BANKS, which materials being considered fully adequate to the purpose, it was undertaken, and the erection finished in the course of the summer of the following year!"

Sir JOSEPH BANKS lived in Chelsea near the garden, and is said to have been a pupil of MILLER in his early days. He presented in 1781 "more than 500 different kinds of seeds collected in his late voyage round the globe."

The next Director, WILLIAM CURTIS, was the author of one of the most beautiful and accurate works on British plants—the *Flora Londinensis*. He was also the originator of the Botanical Magazine which still bears his name. The first number was issued in 1787.

THOMAS WHEELER, considered one of the best botanists of his day, was appointed in 1778, and held office for forty-two years, and was succeeded by his son, JAMES LOWE WHEELER.

Another personality closely linked with the garden was NATHANIEL BAGSHAW WARD who was examiner for prizes in Botany and became Master of the Apothecaries in 1854. His invention, the Wardian case, has been of immense value not only in horticulture, but also in tropical and sub-tropical agriculture and in the transport of economic plants throughout the Empire.

In 1835 Dr. JOHN LINDLEY, F.R.S., Professor of University College, London, was appointed. When he took charge the garden was still laid out on the Linnaean system, and his attempt to introduce the "Natural" system was met with considerable opposition by ANDERSON. After ANDERSON's death, however, and in collaboration with ROBERT FORTUNE, the change over was carried out and the garden reorganised.

MOORE was appointed largely on LINDLEY's recommendation, and they seem to have worked well together, one result of their

co-operation was the well-named Treasury of Botany, published in 1876. It is still a valuable work of reference and contains a mine of information on economic and little known plants.

In 1893 the economies previously mentioned were introduced and LINDLEY's services dispensed with.

The application of the Apothecaries to be relieved of their trust was made to the Charity Commissioners. One of the reasons given for their desire to abandon the garden was that it was no longer suitable for the purposes of a Botanic Garden, owing to the deleterious effects of London smoke and the impoverished condition of the soil.

Incidentally smoke pollution is no recent development, it is of interest to note that over 100 years ago (in 1837) Dr. LINDLEY reported that "the garden had suffered considerably from the unfavourable atmosphere surrounding it, from the exhaustion of the soil, and from the sandy nature of the soil itself."

A Treasury Committee set up to consider the future of the garden decided that it could be of considerable value to students of the Royal College of Science and the various Polytechnics, and that it was in fact still well fitted for such botanical purposes.

They drew up a scheme in which the Trustees of the London Parochial Charities were created Trustees of the garden and a Committee of management was appointed. In July 1899 WILLIAM HALES, then sub-foreman at the Royal Botanic Gardens, Kew, was selected as Curator.

The garden was thoroughly overhauled, the Natural Order Beds were rearranged according to BENTHAM and HOOKER's *Genera Plantarum*, a new range of plant houses was built, and a new laboratory on the ground floor with lecture-room above were erected.

They were completed and formally opened in 1902, and from that date botanical material has been regularly supplied to the Colleges of the University of London, to the Polytechnics, Medical Schools, and many other teaching institutions.

Research into many botanical problems has been carried out in the laboratory which is still in regular use.

The garden is exclusively devoted to scientific purposes and is not open to the public.

Public lectures are, however, held annually under the auspices of the Chadwick Trust, and these lectures are given by some of the most eminent scientists of the day.

Mr. HALES died, while still in harness, in May 1937. He was well known at Vincent Square and served for many years on the Scientific and Floral Committees.

He was an Associate of the Linnean Society and held both the Victoria Medal of Honour and the Veitch Memorial Medal of the Royal Horticultural Society.

HOGG AND EMMERTON ON THE AURICULA.

By T. HAY, C.V.O., V.M.H.

FROM the pages of HARMAN PAYNE's Florists' Bibliography and other sources, we gather that about a dozen books have been written on the Auricula. They date from 1731 to 1857, are of very modest dimensions and the majority are in the German language, a few in French and three in English. In addition to those that deal exclusively with the Auricula there are many books that devote considerable space to the subject and not a few that give the Auricula first place among the plants dealt with. In the case of books dealing exclusively with the Auricula it is evident that the issue in every case has been small, as no book devoted to this plant can be called common ; all can be included among those that the antiquarian bookseller would describe as scarce or rare, and the majority of them are most difficult to obtain.

It is perhaps surprising, when the one-time popularity of the Auricula is taken into account, that the plant did not bring forth a really great book embellished with coloured illustrations ; there is no such book and the beautiful varieties that have had their portraits painted are comparatively few in number and are scattered in many serial publications, all of which have now ceased to exist.

The best and most extensive group of Auricula portraits is to be found in SWEET's Florist's Guide ; in this work there are twenty-six splendid plates in colour of the more famous varieties grown in the first quarter of the nineteenth century.

Of the few English books on the Auricula, that by ISAAC EMMERTON is the most important and sought after—the title page reads :

“A Plain and Practical
TREATISE
on the
Culture and Management
of the
AURICULA ;
With Full Directions for
Preparing The Most Approved Composts ;
Raising Plants From Seed,
&c. &c.
Founded upon Twenty-five Years Successful Experience.

BY ISAAC EMMERTON,
Nurseryman and Florist,
Late of Barnet, Herts.”

There are two editions ; the first was published in 1815 and deals exclusively with the Auricula. The second appeared in 1819 and includes other florists' flowers. The bookseller differentiates sharply as to the value of the two and the first costs double the price of the second. Probably the first volume is more rare, but one would imagine that Emmerton's descriptions of other flowers would have enhanced the value of the Second edition. However, it is often noticeable that even quite small books dealing exclusively with one plant are keenly sought by collectors.

EMMERTON, writing on his favourite plant, is both instructive and highly entertaining, and his long introduction gives us a glimpse of what manner of man he was ; but the real EMMERTON is only revealed by his near neighbour and competitor in trade, THOMAS HOGG, Nurseryman, of Paddington Green.

Of the many books devoted to florists' flowers published in the eighteenth and early nineteenth centuries few, if any, attained to the degree of popularity reached by that from the pen of THOMAS HOGG, the full title of which reads :

“ A
Concise and Practical Treatise
on the
Growth and Culture
of the
CARNATION,
Pink, Auricula, Polyanthus,
Ranunculus,
Tulip, Hyacinth, Rose,
and
other flowers.
Including a
Dissertation on soils and manures,
and containing
Catalogues of the finest and most esteemed
varieties of each flower.

By THOMAS HOGG, Florist,
Paddington Green, Middlesex.”

The first edition was published in 1812 and the sixth and last in 1839. All editions contain a lengthy chapter on the Auricula but the Carnation takes pride of place and occupies most pages. Most of the editions are still plentiful and easily obtainable.

The later ones are furnished with more coloured plates than the earlier issues but the text shows little alteration after the issue of the fourth edition. It is evident that HOGG had a preference for the Carnation and the Tulip, but he also cultivated and exhibited the Auricula with great success.

It is less generally known that in 1833 HOGG published a Supplement to his work on Florists' Flowers, entitled

“A
Supplement
to the
Practical Treatise
on
The Culture of
Florists' Flowers ;
containing
Additional Directions
and
Improved Modes
of Cultivating the
Auricula, Polyanthus, Tulip, Ranunculus,
Heartsease, Carnation, Dahlia,
&c. &c.
With Catalogues
Of the newest and most esteemed Varieties of each Flower.”
Dedicated, By Permission,
To The Queen,
by
THOMAS HOGG, Florist.
Paddington, London.”

This little book is by no means plentiful; the edition must have been small as one very rarely comes across a copy offered for sale. It is similar in format to HOGG's treatise already referred to, and runs to two hundred and eight pages; one hundred and twelve of these are devoted to the Tulip and would give pleasure to those interested in this plant.

HOGG is groping for the cause of “breaking” in the Tulip and is convinced that a complete change of soil and air is the best method of inducing them to “break.” There is an amusing story of a certain Capt. MAC TULPEN, an entertaining rascal in the Tulip line of business; possibly this character was drawn from life but one gains the impression that HOGG had taken to romancing in his old age.

The Auricula is given twenty pages and we learn early that its cultivation called for considerable skill then, just as it does to-day. HOGG remarks that “I am not aware of any other flower that has had half the pains and trouble bestowed on it as the Auricula.”

We learn also that HOGG was largely responsible for the writing of EMMERTON's book which had been published eighteen years previously. He objects strongly to the fearful composts favoured by EMMERTON, who maintained that without them first-class Auriculas could not be grown. HOGG describes them as being too filthy and offensive for general adoption as well as too tedious in preparation.

EMMERTON was in business at Barnet but had to leave that neighbourhood rather hurriedly "in consequence of his having libelled the parson of the parish, a magistrate withall, by hanging him in effigy on a tree in his garden near the public road, and for which offence EMMERTON was indicted and suffered one year's imprisonment in the King's Bench."

HOGG has a good deal to say about EMMERTON's love of talking, good dinners and whisky, and he closes the account of this worthy by relating an amusing story of a gentleman of the India Office who wished to take up the cultivation of the Auricula; his ambitions ran towards winning the silver cup offered by the local Society. EMMERTON was put in charge of this collection and the preparation of his famous compost was the first essential. There were no geese in the Barnet district, without which EMMERTON asserted first-class Auriculas could not be expected. Two geese and a gander were brought by a waggoner from Sussex; these three, according to EMMERTON, would provide before Christmas sufficient fertilizer to last for two years, and they could then be all killed for the Christmas festivities. The odour, however, of the confined geese and other ingredients became too pungent for the ladies of Barnet and they made it so uncomfortable for EMMERTON that he could not appear in the village without being molested.

The end of the story is not unexpected; the geese escaped from their enclosure, either by design or accident, and they ate and destroyed the whole collection of Auriculas. EMMERTON then left Barnet for good and set up in business near to HOGG's nursery in Paddington.

When this interesting Supplement was written HOGG was then an old man suffering from paralysis, and in the lengthy preface to the work he informs us that its writing was undertaken in the hope that it would be of some financial profit to him. The whole country was in a turmoil over the fight for the Reform Bill which had just been carried. No one, he says, paid any attention to gardening or similar pursuits. Cholera had spread death and terror all over the land. There were slight signs that trade was beginning to improve but the florists had suffered severely.

In both preface and concluding chapter he refers to the number of customers who had not paid their accounts; these he divides into those that had intended to pay and were unable to do so, and those who had no intention to pay. His complaint is stated with great dignity and without malice and he concludes by stating that his infirmities prevent him from taking any active part in the business which was being carried on by his two sons.

THE GENUS STREPTOCARPUS.

By W. J. C. LAWRENCE.

(John Innes Horticultural Institution, Merton.)

RUNNING some 500 miles from Cape Province through Natal to the Transvaal and forming the eastern scarp of the high central plateau of South Africa, is that great range of hills, the Drakensberg. The eastern slopes facing towards the Indian Ocean are furrowed with many narrow gorges, known as kloofs, which are often wooded and provide cool and moist conditions for plant life. These kloofs also afford shade from the strong sunshine, for the length of day in this part of Africa varies from ten to fourteen hours, in the main brilliantly sunny.

The kloofs are typically the home of those species of *Streptocarpus*, from which the familiar garden hybrids have been developed. The plants are generally found in the shade of overhanging rocks and boulders or firmly rooted in the crevices between them. They also occur on living or fallen branches of trees, their roots securing a hold in the humus which collects in angles and depressions. Less commonly *Streptocarpus* grows in the soil of the forest floor, but here it has to compete with other plants instead of enjoying its own living room. Occasionally a species (e.g. *S. Dunnii*) is found in open ground, but only in moist soil in the shade of rocks (fig. 1). The genus is essentially a shallow-rooting one, delighting in cool, moist conditions at the root and requiring long hours of not too intense light.

Most of the species are at their best in summer time, corresponding to the winter months in England, when warm moisture-laden winds blow from the Indian Ocean. Where the winds strike the eastern slopes of the mountain ranges, rainfall is frequent, but even in the absence of rain the early mornings are heavy with dew and mist. In winter the prevailing winds are from the arid central plateau, and these are generally dry and cold. Frost, however, is comparatively rare and in the kloofs the plants are well protected from its effects. The average annual rainfall in the *Streptocarpus* region is about 30 inches, heavier in summer than in winter, but on the whole well distributed throughout the year. Summer temperatures range from 65° to 75° F.; winter temperatures from 45° to 55° F.

Streptocarpus, although apparently concentrated in the Drakensberg, is not confined to this region. A number of species inhabit the mountainous parts of Rhodesia, Nyasaland, Tanganyika and South Kenya, where favourable climatic conditions are found at altitudes becoming greater as we pass from south to north. Thus in the Cape Province plants are found at 1,000 feet, although 2,000–4,000 feet is

more usual ; but the northern species in Tanganyika Territory usually grow at 6,000-9,000 feet.

Although considerably more material will have to be collected from South and East Africa before definite opinions can be given, it is already apparent that the distribution of *Streptocarpus* is of special interest from the point of view of morphological distinctions. It should be explained here that the genus, as at present constituted, is divided into two sub-genera, Eu-Streptocarpus and Streptocarpella. The latter group is represented in our gardens by such species as *S. Holstii* and *S. caulescens* (fig. 2) and comprises the stemmed (caulescent) species confined to the tropics. In Africa they do not occur farther south than Nyasaland. Eu-Streptocarpus includes the stemless (acaulescent) forms found mainly in the south, and to this class belong the decorative garden hybrids. These two groups are not only distinct morphologically and in their geographical distribution, but they are completely cross-sterile and have different chromosome numbers, 30 in the case of Streptocarpella and 32 in Eu-Streptocarpus.

Eu-Streptocarpus has been conveniently divided into two sections, the single-leaved (Unifoliati) and rosette (Rosulati) classes. The unifoliates are typically slow-growing monocarpic species with compound inflorescences bearing from about a dozen to fifty flowers. The rosulates are perennials which flower in 6 to 9 months from seed and whose flowers are borne singly, or at most only a few to each spray.

Many species can be assigned at sight to one or other of these sections, but there are some which are not so easy to place. The distinction between unifoliates and rosulates is not so artificial as would appear at first sight ; this becomes clearer if we examine the normal mode of development of plants raised from seed. All newly germinated *Streptocarpus* seedlings bear two equal cotyledons, one of which as a rule soon ceases to grow and eventually shrivels up, while the other rapidly increases in size and develops into a leaf-like structure. It is able to do this because the cells at the base of the persistent cotyledon remain active, and by repeated cell-division give rise to a laminal growth normally indistinguishable from that of a true leaf. Indeed, no plumular bud is to be found in *Streptocarpus*, its place being taken by the meristematic zone where the sessile cotyledon joins the hypocotyl. Now in the case of the rosulates, the enlargement of one of the cotyledons is followed, sooner or later, by the production of true leaves in regular succession from the meristematic zone and thus there are always new leaves taking the place of those which have flowered, and the species is virtually perennial. In a typical unifoliolate no other leaf is formed after the first ; but even in the best unifoliates, e.g. *S. grandis*, *S. Dunnii*, etc., it may happen that the second cotyledon develops, like the first, into a leaf. There is good evidence to show that the tendency to produce two enlarged cotyledons is genetic, and it is actually possible to raise two-leaved strains of unifoliolate species. But whether one or both of the cotyledons develop, the plant dies when flowering is completed, that is, it is monocarpic. We may note

in passing that all of the large-flowered species are, beyond question, unifoliates.

Concerning foliage characters, there is a group of four species more or less intermediate between the narrow strap-shaped rosulates, e.g. *S. Rexii*, and the roundish big-leaved unifoliates, e.g. *S. grandis*. These intermediate species all have small, roundish leaves and comparatively short inflorescences. They also resemble one another in the shape of their small flowers, the narrow corolla tubes of which are sharply curved. Two of this group, *S. polyanthus* and *S. Haygarthii*, are good unifoliates, but the other two, *S. gracilis* (fig. 3) and *S. Comp-tonii*, apart from any development of the second cotyledon, frequently produce additional leaves, although not in such quick succession as the *Rexii* types (fig. 4). The rather meagre information at our disposal indicates that the problem of the unifoliates and rosulates may be solved when the relative frequency of the *Rexii*, *polyanthus* and big-leaved types in the provinces of Africa becomes better known.

The rosulate population is densest in the extreme south, thinning out considerably towards Natal and the north. On the other hand the unifoliates are commonest in the Transvaal, become scarcer as we move south and are rarely found at the Cape. Curiously enough, the *polyanthus* group comes from the intermediate area of Natal, where they may form a link between the rosulates of the south and the unifoliates of the north. Since most if not all of the species of Eu-Streptocarpus have the same number of chromosomes, and since many species readily hybridise, we are on fairly certain ground if we suppose that the *Rexii* type of rosulates and the big-leaved unifoliates are extremes of variation between which gradation occurs in respect of many flower and foliage characters.

For this reason, attempts to classify the genus cannot be regarded as taxonomic exercises, of little value outside the herbarium. Any species at any time is in process of "becoming"—becoming extinct or becoming different. This "becoming" may proceed at different rates, and the *Streptocarpus* population of South and East Africa is an example of a genus which is rapidly differentiating into a number of diverse forms. To take a simple case, *S. Rexii* is by far the commonest rosulate in Cape Province, but it is not uniform from place to place. It seems probable that each mountain range (perhaps sometimes different kloofs) has its own special race, each race being potentially a new species. *Streptocarpus* therefore provides good material for a study of species formation, a problem upon which there is at present far too little experimental evidence.

Apart from its usefulness to the botanist or geneticist, *Streptocarpus* will appeal to the gardener who fancies unusual plants. It has features of special interest at every stage of growth. The seeds borne in the twisted carpels are among the smallest in the world of flowering plants, there being some 1,800,000 to the ounce! Or to take another example, the seedlings are very sensitive to light. When the seeds first germinate, the two equal cotyledons are orientated quite at

random. But should the light fall upon the seedling more from one direction than another, then as soon as one of the cotyledons begins to enlarge it is inclined at an angle and the young seedling twists round on its hypocotyl until the surface of the large cotyledon is held at right angles to the rays of light. The gardener who knows his *Streptocarpus* will not only sow them in the long days of summer in order to get good plants, but he will grow his unifoliates with the leaves facing south if he wants the best results.

Another feature is the capacity of the genus for regeneration from the vegetative parts. All the species can be propagated from their leaves, merely by nicking the midrib in one or more places and laying the leaf on moist soil or sand. Some species have leafy growths on the inflorescences, and these can be treated in the same way. But what is distinctly uncommon is the production, under certain conditions, of new individuals when the leaf blade of a unifoliate has died right away and only the stump of the hypocotyl remains. From this hard stump a small fresh green leaf, remarkably like a seedling plant, may appear and give a new term of life to the individual. Lastly, at least two species are known in which leaves sprout at intervals along the surface roots and become centres of rosette formation.

The range of variation within the genus is very great. *S. grandis*, for example, has a single leaf measuring up to 27 inches long by 30 inches wide, while the roundish leaves of the miniature *S. pusillus* are but 3 or 4 inches in diameter. *S. Gardeni* carries one flower on each stem, while at the other extreme *S. grandis* has been known to bear 280 flowers on the first inflorescence alone! *S. Galpinii* is distinct from all other species on account of its bell-shaped flowers and leaves covered with silvery indumentum. In contrast there is *S. Wilmsii*, whose leaves are almost shiny and whose flowers resemble nothing so much as a white Foxglove. The massive flower spikes of *S. Wendlandii* may be 39 inches tall and as thick as a man's finger, while the 6-inch sprays of the well-named *S. gracilis* are so slender that they bend beneath the weight of the tiny flowers.

Of all the species, *S. Dunnii* (fig. 5) is perhaps the most interesting. It is the only one with red flowers, green filaments and yellow pollen; other species have blue or white flowers, white filaments and white pollen. *S. Dunnii* is the slowest flowering species, taking 15-18 months to come into flower from seed. (In contrast, some of the rosulates will flower in four months.) In all aerial parts, except the flowers, *S. Dunnii* is thickly covered with granules of an orange-red pigment, a character shared only with *S. Pole-Evansii*. In these and other ways *S. Dunnii* is so different from the other species as to present a fascinating problem as to its origin and relationships. It has, however, an even more important claim to distinction. The garden hybrids of many colours which adorn our greenhouses could never have been obtained were it not for the use of *S. Dunnii* as one of the original parents.

Until 1884 only five species of *Streptocarpus* were in cultivation. *S. Rexii* was the first to be introduced, in 1826, then followed *S. poly-*

anthus and *S. Gardeni*, both in 1855, *S. Saundersii* in 1861 and *S. parviflorus* (Hook.) in 1882. All of these, except *S. parviflorus*, have blue flowers; *S. parviflorus* has white flowers with a yellow throat. In 1884 *S. Dunnii* was sent from South Africa to Kew, where it flowered in 1886. The then curator, WILLIAM WATSON, realizing its potential value as a means of obtaining new colours, used it for pollinating *S. Rexii* and *S. parviflorus* and obtained progenies from both crosses. The *Rexii-Dunnii* hybrids bore "mauve-purple" flowers and were given the name *S. × kewensis*. The *parviflorus-Dunnii* offspring had flowers of a "bright rosy crimson" and were called *S. × Watsonii*. In 1887 *S. Rexii*, *S. parviflorus*, *S. × kewensis* and *S. × Watsonii* were crossed in all possible combinations. The flowers of the resulting seedlings showed considerable variation in flower colour and other characters, and about twenty of the most distinct forms, including *S. × kewensis* and *S. × Watsonii*, were passed on to Messrs. Veitch, who were largely responsible for the development of the early strain. Later *S. Saundersii*, *S. polyanthus*, *S. Wendlandii*, *S. Woodii* and *S. cyaneus* were crossed into the strain originated by WATSON, and through further selection the large-flowered garden hybrids as we know them to-day were gradually developed.

Considered purely as a decorative plant for the conservatory, *S. Dunnii* is in every way inferior. Nevertheless its unique flower colour has enabled the plant breeder to raise a strain of plants of great decorative value. This has been achieved by breeding out all the undesirable qualities of *Dunnii*, and we may regard the present-day garden strain as virtually consisting of *S. Rexii* plants to which new flower colours have been added.

Actually, there are seven distinct classes for flower colour in the garden hybrids, namely, blue, mauve, magenta, rose, pink, salmon and ivory-white. These colours are known, from genetical experiments, to arise from three major differences between the flower pigment of *S. Rexii* and the other blue-flowered species on the one hand, and *S. Dunnii* on the other.

There are two strains of the modern *Streptocarpus* hybrids in favour. In one the dark pencilings or lines in the throat have been retained and developed; in the other these lines are absent and the flower is "self-coloured." The latter class is specially attractive when the yellow throat colour is combined with blue or salmon-pink. A more recent novelty is that represented by the Cirrus and Bodnant strains, in which the continued selection of diffused, broad lines in the throat has led to a bicolor flower, the two upper petals being normally coloured while the three lower ones are deeply pigmented by the extended line colour. That other patterns are possible is evident from the breeding experiments in progress at Merton. One species-hybrid had small Violet-like flowers the reverse of those described above, the two upper petals being the deepest; other forms had some petals bluer than others. Picotees have also been observed.

These and other incipient flower patterns or flower shape characters may often be discerned, so that while it is not likely that any novel colours will be obtained in the future, there are numerous possibilities in other directions. If, for example, the elegant little *S. gracilis* had slightly stronger flower stems it would merit a place in any conservatory. *S. cyaneus* should prove a good parent because of its attractive flowers, which are very freely produced. Freedom of flowering in the rosulates depends largely upon the number of mature leaves from which inflorescences arise, and *S. cyaneus* has many of these. *S. pusillus* is another species which might prove useful in the production of a dwarf free-flowering strain.

One other novelty remains to be described. As mentioned above, all species of Eu-Streptocarpus that have been examined have the same number of chromosomes, $2n = 32$. Because of this, many of the species can be successfully crossed; but some of the hybrids are sterile and cannot be bred further. Now to the breeder who wants to use such a species for improving his strains this is a serious drawback. Fortunately, nature sometimes steps in and extricates the breeder from his dilemma, and this is what happened in the production of the hybrid *Streptocarpus* Merton Giant.

The species *S. grandis* has an exceptionally good inflorescence system, consisting of elegant, fan-shaped sprays of flowers carried on strong stems up to 18 inches in height. The first inflorescence to develop grows the tallest and bears many nicely spaced but rather small flowers, a delicate pale blue with a cream throat. Later inflorescences form one in front of the other to give a tiered effect. However, the large leaf of *S. grandis* makes it undesirable as a pot plant. The problem therefore was to combine the fine inflorescence of *S. grandis* with larger flowers of various colours and with a smaller leaf or leaves.

The plant chosen for crossing with *S. grandis* was a garden hybrid bearing pairs of moderately sized flowers of a clear, deep blue on stems 7 inches high. The cross was made and the hybrids, which were all alike, were attractive plants combining the colour and size of the flower of the garden hybrid with the tall, fan-like inflorescence of *S. grandis*. But all attempts to obtain seeds from self-pollination failed, until one day a chance capsule with good seed was found. From these seeds some 200 plants were raised. Not only were they larger and more vigorous than their parent, but all proved fertile. Later this improvement in size and fertility was found to be due to one of those lucky interventions of nature, whereby the chromosome number of the sterile hybrid had been doubled giving fertile tetraploid plants with 64 chromosomes. It was the tetraploid hybrid which was named 'Merton Giant.' Already it has begun to vary, giving a pale blue variety and the production of other colours should be possible in due course.

GROUND COVER.

By FRED STOKER, F.L.S., V.M.H.

In this article ground cover is considered as a veneer of dwarf, close-growing plants over a surface of wholly or partially unoccupied soil. This rather implies that soil is better hidden, but the concealment of soil represents but a small part of the value of ground cover. Its purpose is primarily utilitarian.

Now many excellent gardeners hold that the spaces between plants in a shrub bed should be left free. They remind us that shrubs, like other plants, require aeration of their roots and the occasional refreshment of a little manure and renewal of the surface soil. And how can these items of cultivation be carried out, they ask, if the ground is choked with secondary plants? That is how they put it. Others assert that bare soil indicates a barren imagination, that it is a contradiction of gardening, and, as there are suitable plants for almost all situations, that it need scarcely ever be in evidence.

It is impossible for me to steer so tactfully between these two schools of thought as to escape the opprobrium of either, much less gain the approval of both. What follows, then, amounts to an epitome of personal impressions, experiences, likes and dislikes set down without documentation, citation or other etcetera.

I never cared for "specimen" plants; those trees and shrubs placed in isolation in order to attain their full development. Magnificent, no doubt, many of them are, but, like that of stuffed tigers in a museum, their magnificence strikes the stranger more than the habituated. Their owner, though proud of them in a possessive way, passes them by with scarce a glance; with as little notice as that he gives to the tick-tock of the grandfather's clock which he has heard, but neglected, for half a century. One day he may chance to give a specimen more than a cursory glimpse and possibly discern that it has a sad and lonely look. And no wonder. Plants are gregarious creatures. Their avoidance of solitude when left to themselves may denote some quality in it injurious to themselves, and, conversely, their liking for communal life points to benefits it confers. What some of these benefits are is strongly suggested by the effect of ground cover on soil, and hence upon the plants growing in it: the cover plants themselves and the taller subjects (henceforth referred to as associates) growing through them.

Vegetation, especially evergreen vegetation, is the most important protection against erosion of soil, and the closer its application to the soil the greater the protection it affords. In this country we are seldom brought into contact with the real grimness of soil erosion. Unintentional reference is sometimes made to its minor degrees by comments on the strange habit of stones in coming to the surface, on

the value of March dust and so on, but our gardens suffer little from their contribution to that dust. A very different state of affairs obtains in the Bad Lands of South Dakota and parts of Tanganyika. Those territories show the full expression of erosion—show, in other words, how wind and flood remove imperfectly protected soil down to the underlying rock and thereby create deserts where there might be abundance. Nothing so effective as ground cover can be conceived for the prevention of this catastrophe; its upper parts shield the soil from overhead attack while its roots act like the reinforcements in concrete.

A screen of ground cover exerts another invaluable effect. As no appreciable amount of sun or wind can pass its foliage, evaporation from the soil surface is negligible and thus soil water is conserved. That as much moisture may be lost by transpiration through the plants as is saved by checking evaporation from the soil seems possible. But it does not happen. The cover plants, in short, save more water than they and their associates can spend.

Ground cover, at all events evergreen ground cover, is also a safeguard against frost-induced physiological drought, a condition which ensues when the soil water, although plentiful, is rendered unabsorbable from its low temperature. Really hardy plants seldom suffer. They could not, indeed, be hardy without the capacity of sucking water from frost-penetrated ground. Half-hardy subjects, on the other hand, possess no such faculty and, in consequence, are apt to die from water starvation in winter. Measures to avoid this disaster are directed at keeping the temperature of soil water above the point at which it is made useless to the plant. Mulches, if they are sufficiently thick and hold enough air in the mesh, ward off the cold, and, of all mulches, none entail so little trouble, are more efficacious and so pleasant in appearance as living ones.

Any means of economizing labour without sacrificing what it normally gives is a blessing, and no labour is more begrimed than that spent on weeding. Few weeds, however, are allowed to work their will in an evergreen mat. They cast seeds upon it hopefully, but most of the seedlings are strangled at birth while the few survivors, sick of their lot, give themselves up to the first passer-by.

Ground cover has one other outstanding quality to its credit. It gives interest and beauty to any empty plot of ground, large or small, if, that is to say, the plants used are themselves of garden value. Incidentally, the policy of "planting anything to fill up" is a mistake and one that will scourge the planter. There are plenty of worth-while plants capable of anything the scallywags can do.

The liking of many gardeners for bare areas of soil has already been alluded to. I do not criticize their attitude and at once admit that, if a vote was taken, the favourers of a soil surface would considerably outnumber those who prefer something more animated and animating. It may be suggested, though, that soil is presumably intended to bear plants, and as many as it can reasonably hold.



"With acknowledgments to Dr. Pole-Evans

FIG. 1.—*STREPTOCARPUS DUNNII* GROWING IN THE SHADE OF BOULDERS IN EASTERN TRANSVAAL.
(See p. 17)

[To face p. 24]



Fig. 2.—*STREPTOCARPUS CAULESCENS* · TANGANYIKA^a
(see p. 18)



Fig. 3.—*STREPTOCARPUS GRACILIS*: NATAL
(see p. 19)

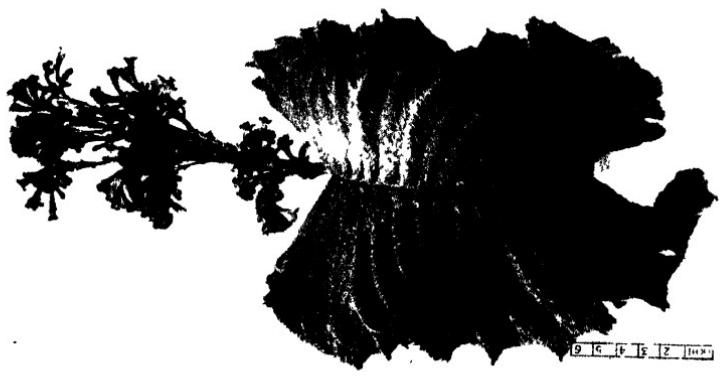


FIG. 4.—*SIRFPTOCARPUS RENII*

PROVINCE
(see p. 19)

mm 1 2 3 4 5



FIG. 5.—*STREPTOCARPUS DUNNII*

TRANSVAAL
(see p. 20)

FIG. 5.—*STREPTOCARPUS DUNNII*:
TRANSVAAL
(see p. 20)



FIG. 6.—THE CHELSEA PHYSIC GARDEN IN ITS EARLY DAYS
(see p. 9)



FIG. 7.—THE CHELSEA PHYSIC GARDEN IN PHILIP MULLER'S DAYS
(see p. 9)



FIG. 8.—THE FIRST SHOW OF THE WAR, OCTOBER 24 AND 25, 1939.
(see p. 5)



FIG. 9.—*MITCHELLA REPENS* AS GROUND COVER UNDER PINES.
(see p. 26)



FIG. 10.—*LITHOSPERMUM PROSTRATUM* AS GROUND COVER FOR RHODODENDRONS.

(see p. 25)

"To face p. 25.

It is in winter, when deciduous shrubs have lost their foliage, that the ground beneath them catches even the casual eye; agreeably when clothed with such dwarf evergreens as *Gaultheria procumbens*, still holding its bright red fruits, but with depressing consequence if in a naked state of greasy earthiness. This is not to say that cover plants are without beauty at other seasons but only that they are less noticeable when there are many competitors for regard.

And many of them make another substantial contribution to the fairness of a garden in the more or less subsidiary part of foils. *Crocus chrysanthus* looks very different when starring the soft velvet of Wild Thyme (*Thymus Serpyllum*) than when beaten down and soiled on a patch of earth. (No anxiety need be felt about the ripening of the corms. That process has nothing to do with drying-off but is a function of a fully active plant.) A few other examples of ground coverers upon which similar double duties may be imposed are *Viola labradorica* (with Trilliums as associates), *Cornus canadensis* (with Erythroniums), and *Pernettya mucronata* (with Birches). They can, in fact, be numbered by the dozen, but the three just given may convey some idea of their range. But to say they perform only double duties is an understatement. They discharge at least three offices: that of shielding the soil, of giving beautiful flowers or fruits and of serving as covert, as it were, for other plants.

Ground cover, however, like other good things, is not without its vices, although these, when weighed against the benefits it confers, are of a minor order. Aggressiveness is its great crime—unprovoked aggressiveness, for nothing in the way of rich soil, sheltered position or other characteristic of a land of milk and honey is needed to incite it. A certain amount of forcefulness is, of course, required by a plant to make it a ground coverer, but when that amount is exceeded, and the plant becomes a violent competitor against its associates for means of sustenance, particularly air and light, then the character comes to be a nuisance.

Even the lowly Thyme, already commended, if left to its own devices, can overgrow such a plant as *Penstemon Menziesii* with the greatest ease, and deal with *Cytisus demissus* as though it were no more than an irregularity of the ground. I would not trust it, indeed, in the neighbourhood of *Erinacea Anthyllis* or the shrubby Astragaluses. Thyme's relentless progress is by means of prostrate, rooting branches and by seeds—seeds which will germinate eagerly on scree, in the tiniest crack of a rock or in the depths of a Saxifrage. And *Lithospermum prostratum* (fig. 10), if it likes a garden, can be too demonstrative of its affection. Given the chance, it will sweep over an eighteen-inch Berberis and successfully dispute the ground with *Cotoneaster adpressa*. I have known, too, of *Daboecia cantabrica* suffocating *Vaccinium erythrocarpum* and then trying conclusions with a Syrian Juniper (*J. drupacea*) encountered in its advance. The Juniper, 12 feet high, disregarded its adversary. But disregard is too refined a weapon to resist Connemara Heath, and, taking advantage of the hoped-for victim's quiescence,

it had, when I saw it last, scaled the branches of the tree to a height of $3\frac{1}{2}$ feet. Then *Arctostaphylos Uva-ursi*, normally prostrate and an excellent ground cover for tall Rhododendrons, takes alpine species of the latter genus in its stride.

Yet such occurrences do not condemn ground cover. It is not to blame if wrongly used ; if, in short, it is unsuited to its associates. We arrange the association. But, having arranged it unwisely, what are we to do when the cover plants attempt to overwhelm the neighbours they were meant to benefit ? There are two methods of treatment. The first, and more radical, is to replace them with plants of more modest tendencies. The other, which I use myself (for I have made every possible mistake in this direction), is to check their assaults with shears, knife and trowel.

But it is not always ignorance that brings about an unfortunate association. The behaviour of a plant in a new situation cannot be foreseen with any accuracy. *Nertera depressa*, for example, is not generally looked upon as rampant, yet it is naturalized in the turf of at least one East Anglian garden. *Mitchella repens* (fig. 9), too, is very temperamental but, if it likes its place, is apt to become bothersome. So, whatever our knowledge of the habits of a plant, the only sure way of testing its reaction to environment is by trial.

That many ground coverers will not grow under certain trees may, perhaps, be reckoned a vice on their part. This time the trees, casting heavy shade and being too avid of water, are the stronger competitors. "Nothing will grow under a Beech" expresses, though rather exaggeratedly, the competitive strength of that tree.

Closely adjacent plants, whether of the same or different kind, are said to have an injurious effect upon each other through the action of a hypothetical toxin excreted by their roots. But although toxins, especially of the conjectural kind, are popular scapegoats, observations go to support the theory. It need not, however, be seriously taken into account when planning a ground cover. No harm is likely to befall either carpeting plants or their associates which cannot be put down to other causes.

Nor need we be deterred by the difficulty or impossibility of artificially aerating plant-covered soil. Roots do the work naturally, unceasingly and efficiently enough for the plants.

The selection of ground coverers is governed by the soil, atmospheric conditions and locality of the garden for which they are intended, by the position they are to occupy and, not least, by the partialities of the gardener. The following list, by no means comprehensive, is of plants I have found satisfactory for the purpose. For obvious reasons, preference is given to evergreens. Deciduous subjects are indicated by (D) and those requiring a neutral (or slightly acid) soil by (N).

FOR BARE, DRY, SUNNY BANKS : *Cotoneaster adpressa* (D), *congesta* and *humifusa* ; *Genista dalmatica*, *pilosa* and *sagittalis* ; *Helianthemum vulgare* and vars. ; *Halimocistus Sahucii* ; *Juniperus procumbens* ; *Pernettya leucocarpa* (N), *mucronata* (N) and *pumila* (N) ; *Racotis australis* ; *Thymus azoricus*, *Herbabona* and *Serpyllum* (especially vars. *coccineus* and *lanuginosus*).

FOR SHADY BANKS: *Arctostaphylos Uva-ursi* (N); *Juniperus procumbens*; *Linnaea borealis* (N); *Lithospermum prostratum* (N); *Vinca minor* and vars.; *Viola gracilis* and *labradorica*.

UNDER LARGE, DECIDUOUS TREES: *Cotoneaster* spec. (*vide supra*); *Euonymus radicans*; *Hypericum calycinum*; *Ruscus aculeatus*.

UNDER PINES: *Cornus canadensis* (D, N); *Cyathodes empetrifolia* (N); *Gaultheria procumbens* (N) and *Shallon* (N); *Leucopogon Fraseri* (N); *Mitchella repens* (N); *Nertera depressa* (N); *Phlox adsurgens* (N); *Schizocodon macrophyllus* (N), *soldanelloides* and vars. (N); *Shortia galacifolia* (N), *uniflora* and var. (N); *Parochetus communis* (D); *Vancouveria planipetala* (N); *Viola labradorica*.

UNDER AND ABOUT SMALL TREES AND SHRUBS: *Arctostaphylos Uva-ursa* (N); *Cotoneaster* spec. (*vide supra*); *Daboecia cantabrica* (N); *Euonymus radicans*; *Gaultheria procumbens* (N); *Genista sagittalis*; *Lithospermum prostratum* (N); *Thymus* spec. (*vide supra*); *Vaccinium Vitis-Idaea* (N).

PLANTS TO WHICH AWARDS HAVE BEEN MADE IN 1939.

***Montbretia 'The Honorable Mrs. Edwin Montagu.'** H.C. August 31, 1939, for garden decoration. Sent by Messrs. W. H. Simpson, Monument Road, Birmingham. Plant of robust habit; flower stems 2½ feet tall, branched, freely produced; flowers 3 inches diameter, orange-chrome, shaded scarlet at the tips, throat paler, faintly blotched with carmine.

***Montbretia 'Lady Wilson.'** A.M. August 31, 1939, for garden decoration. Sent by Messrs. W. H. Simpson, and by Messrs. R. H. Bath, Wisbech, Cambs. Plant vigorous and increases rapidly; flower stems 3 feet tall, branched and freely produced; flowers 3½ inches diameter, deep rich orange-yellow self.

***Montbretia 'Princess Mary.'** H.C. August 31, 1939, for garden decoration. Sent by Messrs. R. H. Bath. Plant of compact upright habit, with flower stems 2½ feet tall, freely produced; flowers 2½ inches diameter, bright chrome-yellow shaded orange, throat blotched crimson.

***Montbretia 'R. C. H. Jenkinson.'** A.M. August 31, 1939, for garden decoration. Raised by Mr. J. E. Fitt and introduced and sent by The Honorable Mrs. E. Montagu. Plant of compact habit; flower stems 3 feet tall, freely produced; flowers 3½ inches diameter, rich orange-scarlet, zoned at the throat orange, flushed scarlet.

* After trial at Wisley.

DIFFERENT WAYS OF COOKING WINTER VEGETABLES.

By Lady HALL.

THE proper cooking of vegetables in wartime becomes important for two reasons. In the first place we are likely to become short of some of the major items of diet and consequently we must get the full food value out of them, which can only be done if the vitamins and other food accessories that vegetables supply are also present in adequate amount. Then the vegetables must be rendered attractive, especially for children who can rarely be induced to eat enough of them when they are only presented in the form of boiled potatoes and watery cabbage. Lastly economy dictates that the form of cooking shall retain all the goodness of the vegetables, of which a good deal often goes down the drain with the boiling water. Therefore my first recipes describe a way of cooking vegetables in which no waste is possible. Almost any vegetable can be cooked in this way, I will mention only two as examples.

Leeks.—Prepare the Leeks in the usual way and then cut them in pieces about $\frac{1}{4}$ or 1 inch long. Put these in a saucepan with 1 oz. of margarine to every pound of vegetables together with 3 tablespoonfuls of water. Sprinkle lightly with salt, but be careful not to add much. Put a grease-proof paper over the saucepan, jam on the lid very tightly and cook gently over a gentle heat for about 35 minutes. Serve with the liquid.

Brussels Sprouts.—Wash and trim the sprouts and slit the stem. Put them in the pan with 1 oz. of margarine, 4 tablespoonfuls of water and a very little salt to each pound of sprouts. Wedge on the lid tightly as for the Leeks, bring to the boil and simmer very gently for 20 minutes. Serve with the liquor.

Different vegetables obviously require different times for cooking, they also need different amounts of water. For example, Spinach, Lettuces, Tomatos require no water ; Cabbages need less than Turnips or Potatos and so forth. The two important things to remember are that no steam must be allowed to escape and only a very little salt must be added.

There must be literally hundreds of ways of cooking Potatos, but I shall content myself with three, all of which are attractive with cold meats.

(1) Slice some raw Potatos in thin slices and finely chop some Onions (say one Onion to 1 lb. of Potatos). Take a fireproof dish with a fitting lid, well grease it and cover it with a layer of the Potatos, sprinkle with salt and pepper, and some of the chopped Onion, add some bacon cut into very small pieces and continue these layers. The top

layer should be Potatos with little pieces of butter. Cover tightly and cook in the oven in a gentle heat for about an hour and a quarter.

(2) Brush a fireproof dish with melted butter. Cover the bottom of the dish with sliced raw Potatos, about $\frac{1}{2}$ inch thick. Season with salt and pepper and lightly sprinkle with flour. Put some little pieces of butter on the top and repeat the layers until the dish is full. Pour in sufficient hot milk at one corner until it almost reaches the top of the Potatos. Cover with a lid or failing this two thicknesses of grease-proof paper. Cook in a moderate oven for about an hour and a quarter. Remove lid or paper and cook until a golden brown.

(3) Melt an ounce of butter in a saucepan and add to it $\frac{3}{4}$ lb. of sieved boiled Potatos, or, better still, baked Potatos. Add the beaten yolk of an egg and stir well in, season well with salt and pepper and add $1\frac{1}{2}$ oz. of grated cheese. Now add the stiffly beaten white of the egg and lightly fold in. Put lumps of this mixture on a greased baking sheet and cook till brown in a hot oven.

Here is a very simple but at the same time very good way of making a dish out of a baked Potato. Rather large, regularly shaped Potatos are required. Cut off the top to act as a lid, and scoop out of the raw Potato a hole large enough to contain a kidney. Leave some of the kidney fat on it and press well down into the Potato; put on the lid and tie round with string. When the Potato is baked the kidney is ready, and will be found excellent. A sausage may be substituted for the kidney but it is not quite so good.

Most people become thoroughly tired of Cabbage in the winter, particularly those who grow their own vegetables. Nevertheless the Cabbage can be an extremely attractive vegetable, whether of the white or the red variety. Here are a few of the less usual ways of dealing with Cabbage.

(1) Choose a good hearted Cabbage and chop it fairly finely. Plunge this in boiling water for 10 minutes. Butter a casserole and cover the bottom with a layer of the Cabbage, season with salt, pepper and a little nutmeg; now add a layer of sliced cooking Apples, then a second layer of the Cabbage and Apples. Add a little chopped bacon and pour over a large piece of melted butter or better of dripping. Cover and allow this to cook for about 2 hours.

The ordinary Cabbage purée which is simply Cabbage boiled and put through a sieve with a large piece of butter stirred in just before serving, is greatly improved by adding a little nutmeg to the other seasoning.

Have you tried Cabbage with partridge cooked together in a casserole? Here is a very good French recipe. Old birds do quite well and make it therefore a comparatively inexpensive dish. Cut the Cabbage into about four pieces and place it in a saucepan with about $1\frac{1}{2}$ oz. of butter and 3 tablespoonfuls of water. Fit the lid on very tightly and cook slowly for about three-quarters of an hour. While this is cooking prepare the partridges. After trussing put them in a casserole with a piece of butter, salt, pepper, a Carrot and Onion, and

a piece of fat bacon. Let the partridges become thoroughly brown and then add a tablespoonful of flour, a bouquet of Thyme, Parsley, Bay leaves, and a small cup of stock. Cook for about half an hour. By this time the Cabbage is ready ; add it to the partridges and cover the casserole carefully. Simmer until the birds are cooked. The addition of a few Chipolata sausages is very pleasant. Old pheasants may be cooked in exactly the same way and are excellent.

Stuffed Cabbage leaves make a pleasant luncheon dish and, moreover, are a good way of using up cold meat. Parboil the Cabbage and when cold separate the leaves—or you can remove the outside leaves and boil only the leaves that you require, in which case take care that the leaves are not broken. Mince the meat and fry it with minced Onions and Shallots. Season well and mix with about the same quantity of boiled rice. Add a little gravy and put some of the mixture on each Cabbage leaf. Roll them up and place side by side in an earthenware dish. Pour over some good stock and cook gently until the stock has almost disappeared. A little grated cheese may be added and browned under the grill. Serve either plain or with Tomato sauce.

The following is a Californian recipe for cooking Cabbage. Wash and quarter the cabbage and cover with boiling water. Cook for 15 minutes. Drain off the water, cover with fresh boiling water and cook until the Cabbage is tender. Drain carefully and set aside until cold. When cold chop the Cabbage very finely, add a tablespoonful of melted butter, 2 eggs well beaten, 3 tablespoonfuls of cream and seasoning. Bake in a moderate oven for about half an hour.

Red cabbage is not eaten in this country as a hot vegetable as often as it deserves. It can be very good indeed. Here is a simple way of cooking it. Blanch a red Cabbage cut in quarters for about 10 minutes ; then put it in a casserole which has been well greased. Salt and pepper it and add about $\frac{1}{2}$ lb. (for a good sized Cabbage) of chopped Onions. Place some chopped bacon on the top and cook in a moderate oven for 2 hours. From time to time add a little stock if it seems too dry. If a sharper flavour is preferred, in place of the stock add a tablespoonful of vinegar in which half a tablespoonful of sugar has been melted.

Here is the Alsatian way of doing the same thing. Take a red Cabbage and shred it. Blanch it in salted water and drain thoroughly. Melt in an earthenware casserole some pork dripping and a finely chopped Onion. Add the red Cabbage and a drop of wine vinegar, season well and pour over a tumbler of red wine. Cook very slowly for about 3 hours.

Red Cabbage with Apples is another way of turning the former into an excellent vegetable. Shred the Cabbage very finely into straw-like pieces. Wash very thoroughly and place in an earthenware saucepan with a good piece of butter or dripping. Season well and add a tablespoonful of wine vinegar. Stir well together and cook slowly with the lid on for about an hour and a half. Then add three Apples cut

in small pieces and a tablespoonful of sugar. Stir well and cook for another hour. Very slow cooking is essential for all these Cabbage recipes.

The Cauliflower does not lend itself to many different treatments and is rather a dull vegetable. It is a little more interesting if fried. This is a simple way of doing this. Wash the Cauliflower and break it into flowerets. Cover with boiling, salted water and cook for about 10 minutes or until nearly tender. Dip these pieces into seasoned beaten egg and then into breadcrumbs and fry in deep fat until golden. Or you can dip the pieces into a light batter and fry. These are called Cauliflower oysters. Then there is the Choufleur Polonaise. For this you break the Cauliflower into a number of pieces and cook them in boiling salted water with a drop or two of vinegar. Before they are quite cooked drain very well. Put them in a pie or soufflé dish, season with salt and pepper and a finely chopped, hard-boiled egg. Keep this very hot. Now melt a large piece of butter, about 3 oz., and throw into it 1½ oz. of breadcrumbs. Do not allow these to become brown. Pour the mixture over the Cauliflower together with some finely chopped Parsley and serve.

Cauliflower cream is also a pleasant change. Boil the Cauliflower until tender, then take all the flowery part and beat it with a fork until smooth and creamy. Add some finely chopped Thyme and Parsley, 2 oz. of finely grated cheese (cheddar and parmesan mixed is best), salt, pepper and cayenne, 1 tablespoonful of milk and 1 tablespoonful of cream. Put the mixture in a fireproof dish, sprinkle grated cheese over it and place little pieces of butter on top. Brown in the oven.

Brussels Sprouts are also vegetables of which one tires quickly but they are greatly improved if they are lightly fried after boiling in the usual way until they are cooked but firm. Some people like them cooked with Chestnuts whose nutty flavour mingles pleasantly with that of the sprouts. Cook and drain the sprouts carefully, then toss in butter. The sprouts must not be boiled too much as each one should be firm and separate. The Chestnuts should be boiled and both skins removed. Then cook them in some meat stock until they are tender. Drain them carefully and mix with the sprouts.

The following is a good Sprout soup. Parboil and drain well 1 lb. of young Brussels Sprouts. Put them in a pan with about 3 oz. of butter. Cover tightly and simmer gently for about half an hour. Add a pint of stock, 2 sliced Potatos and 1 chopped Onion. When all are cooked pass through a sieve and add boiling milk. The soup should be velvety and creamy and not a thick purée. A little cream added just before serving will increase its smoothness. Serve with croutons of fried bread.

In addition to the way of cooking Leeks given at the beginning of these notes there are other ways that are attractive and not very common in England. After cooking as already mentioned add a little flour to the Leeks in the pan, a little pepper and a little grated nutmeg.

Add a cup of milk and bring to the boil. Now add the yolk of an egg and one whole egg well beaten. Do not let it quite boil after the egg is added. Serve immediately. Or again they may be cooked in a pie-dish with cheese. Parboil the Leeks, lay them in a pie-dish, sprinkle with grated cheese, add more Leeks and more cheese and so on to the top of the dish, finish up with the cheese and little bits of butter ; add at one side about a cupful of milk and bake until quite tender and golden brown. Leeks are also very good when cooked under the meat in the same way as roast Potatos, but it is better to parboil them first.

Turnips are vegetables that I, personally, dislike, but I have enjoyed them cooked in the following ways. After thickly peeling them cut them into small pieces ; put them in a saucepan with a piece of butter (about 1 oz. to 1 lb. of turnips) and about 4 tablespoonfuls of good meat gravy. Cook until tender, about 35 to 45 minutes according to the age of the Turnip.

Turnip purée is extremely good with boiled mutton. Peel the Turnips, cut them in rounds and cook them in as little water as possible. Strain very carefully, it is important to get rid of every drop of water. Put them back in the pan with about 1 oz. of butter to each pound of Turnips. Add 1 gill of cream to which has been added $\frac{1}{2}$ ozs. of flour, and 1 oz. of Capers and pepper and salt. Stir all together and bring almost to the boil.

This year produced such a tremendous crop of Apples that every one has almost a superfluity. Try baked Apples with mincemeat for a change. Core and peel the Apples. Fill the centres with mincemeat. Place them in a well buttered baking dish. Mix in a saucepan $\frac{1}{2}$ a cupful of water with 1 cupful of sugar over which has been sprinkled some cinnamon powder. Cook for about 10 minutes. Pour over the Apples and bake in a moderate oven until the Apples are tender. The Apples should be frequently basted with syrup.

Apple Mousse is a very light and also attractive dish. Bake the Apples in the oven and remove the pulp. Add castor sugar to this and stir it very well in by whipping. The pulp should taste a shade sweeter than you want the final result to be. To every pound of Apples before cooking allow 2 egg whites. Beat them to a very stiff froth and fold into the Apple mixture. Butter and sprinkle a soufflé dish and pour in the mixture. Cook in a moderate oven for about 10 minutes.

Apple Schmarren is a pleasant variety of Apple Charlotte. Cut some crumb of bread into small dice and about the same quantity of Apples. Sprinkle the bread with Cinnamon powder. Melt some butter, a good sized piece, in a frying pan and when really hot fry the dice of bread for about 5 minutes, now add the diced Apple and fry for another 5 minutes or so. Sprinkle with castor sugar and serve very hot.

**EARLY-FLOWERING CHRYSANTHEMUMS
AT WISLEY, 1939.**

Two hundred and ninety-two stocks of Early-flowering Chrysanthemums, representing two hundred and sixty-two varieties, were grown at Wisley in 1939. These had been selected by the Joint Early-flowering Chrysanthemum Committee as representative varieties and also included varieties selected for trial in 1938.

All the varieties which were grown at Wisley in 1938—these were grown again in 1939—were lifted from the open ground during November, the stools washed free of soil, and immersed in hot water at 110° F. for twenty minutes as a precaution against eelworm attack. They were boxed and cuttings were taken in February; when rooted they were transferred to a bed in a cold frame, and planted in their flowering quarters on May 12, 1939. The plants after their first stopping grew satisfactorily and flowered well. Some varieties were grown naturally, no disbudding being done; these are denoted by an asterisk (*) in the report; others were disbudded, one flower being allowed to develop on each main growth.

The trial was inspected by the Joint Early-flowering Chrysanthemum Committee of the Royal Horticultural Society and the National Chrysanthemum Society, which made recommendations for Awards as in 1938, the final inspection being made during the end of the last week in September.

The varieties are divided into colour groups in the report, on similar lines as for the 1938 report (see JOURNAL R.H.S., 64, pp. 90-98).

Varieties which were recommended for Awards during 1939 are described under their respective colour groups; then follow the varieties which are retained for future judgment and for comparison—these received Awards in 1938 and are the standard varieties against which new-comers are judged. Varieties relegated to the general collection fall just below the high standard set for an awarded variety, although many are very floriferous and make a brave show in the garden. Varieties discarded may be regarded as superseded. The report indicates the present state of the trials.

Flowers White.

Debutante (raised by the late Mr. J. W. Scott, introduced by Messrs. Lowe and Shawyer and sent by Messrs. Vinten, Balcombe, Sussex, and Mr. W. H. Cole, Sarisbury Court Nurseries, Southampton). **A.M.** September 28, 1939, as a disbudded variety for cutting and garden decoration.—3 feet. Flower stems 18 inches long, stiff. Flowers 5 inches, disbudded, somewhat incurved at the centre, clear white. This variety is sometimes known as 'Elsenham White.'

Mayland White (raised and sent by Mr. W. Avery, Henham, Bishop's Stortford). **H.C.** September 28, 1939, as a disbudded variety for cutting and garden decoration.—2 feet. Flower stems 15 to 18 inches long. Flowers 4½ inches, disbudded; inner florets incurved, outer flattish, creamy-white.

White Splendour (raised and sent by Mr. A. W. Thorpe, Lichfield). **H.C.** September 19, 1939, as a disbudded variety for garden decoration.—2½ feet. Flower stems 15 to 18 inches long. Flowers 4 inches, disbudded; inner florets erect, outer horizontal, white.

The following varieties are retained for comparison :

ALABASTER, A.M. 1938	POLAR SNOW, A.M. 1938
ARTIC CIRCLE, A.M. 1938	SANCTITY, A.M. 1938
FELICITY, A.M. 1938	SNOWFALL,* A.M. 1938
HILLCREST WHITE, A.M. 1938	TIBSHELF WHITE, A.M. 1938
LETTICE,* A.M. 1938	WHITE LADY, A.M. 1938
PLUIE D'ARGENT,** A.M. 1938	

The following varieties have been relegated to the general collection :

BORDER WHITE*	FLORAMRAD*
CHASTITY	WHITE CRUSADER

The following varieties have been discarded :

IMMACULATE	WHITE BUTTERCUP
KATE FERGUSSON	WHITE COUNTESS, syn. MARY
MRS. J. RILEY (not an early)	COLVIN
SWANSDOWN	WHITE SPRAY*

Flowers Cream.

The following variety has been relegated to the general collection :

LICHFIELD CREAM* (as a spray variety; to be grown disbudded)

The following variety has been discarded :

CRANFORD CREAM*

Flowers of Yellow Shades.

Butterglow (raised and sent by Mr. A. W. Thorpe). **A.M.** September 19, 1939, as a disbudded variety for cutting and garden decoration.—4 feet, very free-flowering. Flower stems 18 to 24 inches long. Flowers 5 to 6 inches, disbudded, incurved, creamy-yellow.

Mrs. Irene Torrance (raised and introduced by Mr. Alex. McAlpine and sent by Messrs. H. Woolman, Shirley, Birmingham). **A.M.** September 19, 1939, as a disbudded variety for cutting and garden decoration.—3 feet. Flower stems 18 to 24 inches long. Flowers 4½ inches, disbudded, incurved, deep rich golden-yellow; florets very hard and stiff.

Peveril (raised and sent by Messrs. J. and T. Johnson, Tibshelf, Derbyshire). **A.M.** September 19, 1939, as a disbudded variety for cutting and garden decoration.—3 feet, of erect habit. Flower stems 18 to 24 inches long. Flowers 4½ to 5 inches, disbudded, incurved, bright golden-yellow.

Sunny Charm (raised (1937) and sent by Messrs. J. and T. Johnson, Tibshelf). **A.M.** September 7, 1939, as a disbudded variety for market and garden decoration.—2½ feet, very free flowering, bushy habit.

Flower stems 15 to 20 inches. Flowers 4½ inches, disbudded, inner florets erect, outer somewhat recurved, bright golden-yellow.

Harvest Moon (raised by Mr. F. Woolman and sent by Messrs. H. Woolman, and Messrs. Greenyer, Worthing, as 'Incurved Autumn Gold,' a sport from 'Autumn Gold.' Prior name 'Harvest Moon'). **H.C.** September 19, 1939, as a disbudded variety for cutting.—3½ feet. Flower stems 18 to 24 inches. Flowers 3½ inches, disbudded, incurved, a lighter tone of Empire Yellow H.C.C. 603; florets stiff and very hard.

Hollicot Yellow (raised by Mr. W. Roots and sent by Mr. J. B. Stevenson, Colham Green, Hillingdon, Middlesex). **H.C.** September 19, 1939, as a disbudded variety for garden decoration.—3 feet. Flower stems 15 to 18 inches long. Flowers 4 inches, disbudded, somewhat incurved, bright golden-yellow. Also known as 'Goldfinder.'

Yellow Lichfield Cream* (raised and sent by Mr. A. W. Thorpe). **H.C.** September 19, 1939, as a spray variety.—2 feet. Flower stems 9 to 16 inches. Flowers 4 inches in spray form, incurved, pale yellow. Sport from 'Lichfield Cream.'

The following varieties are retained for comparison and future judgment:

AUTUMN GOLD	HERBERT SUTCLIFFE, A.M. 1938
CRAINFORD*	KINGCUP
DIGNITY, A.M. 1938	MRS. CISSIE BIGGAM
EARLY ROMANCE	PRIMROSE CIRCLE, H.C. 1938
GEORGE MACLEOD, A.M. 1938	PRIMROSE RECORD, A.M. 1938
GOLDEN GEM,* A.M. 1938	SUNBEAM, A.M. 1938
HARLOW	THE ASHES,* A.M. 1938
HARVEST GOLD	

The following varieties have been relegated to the general collection:

DAFFODIL	HARVEST GLORY
GOLD CHARM	LAUREATE
GOLD PEAK	LEMON EXCEL
GOLDEN CREST	MRS. FRANK MASON
GOLDMINE	ROSENNEATH BEDDER*

The following varieties have been discarded:

BALCOMBE GOLD	NITA
GOLD STANDARD	ORANGE QUEEN
HARVEST GLORY	SUSSEX GOLD
MRS. W. D. CARTWRIGHT	TOP SCORE (not an early)

Flowers Cream-Pink.

The following variety is retained for future judgment:

PERLE CHATILLONNAISE

Flowers of Pink Shades.

The following varieties have been retained for comparison and future judgment:

ALANA	PINK PROLIFIC
BABY ROYAL,* A.M. 1938	PINK REWARD
DR. GEORGE BARNES	ROSY MORNING, A.M. 1938
FREDA, A.M. 1938	SILVER QUEEN
LICHFIELD PINK	SUZY, H.C. 1938
PINK PRÉCOCE,* A.M. 1938 (and disbudded)	SYBIL, F.C.C. 1938
	YOUTH

The following varieties have been relegated to the general collection :

ALPINK	NANNETTE*
CORONATION	STELLA
DOROTHY PARKIN	

The following varieties have been discarded :

ALECTO	PINK DOMINO*
ÉLITE (not an early)	PINK GEM*
FORWARD (not an early)	PINK PROFUSION* (not an early)
JULIANA	ROSE PRINCESS (not an early)
LEDA (not an early)	SHIRLEY LILAC
LORNA	SHIRLEY PRIDE*
MODESTY*	SINCERITY (not an early)
PINK CIRCLE*	

Flowers of Rose Shades.

Helen Thorpe (raised and sent by Mr. A. W. Thorpe). **H.C.** September 19, 1939, as a disbudded variety for cutting.—3 feet, of erect habit. Flower stems 15 to 18 inches long. Flowers 4½ inches, disbudded, incurved, yellowish-biscuit flushed with rose.

The following varieties are retained for comparison :

CHARNWOOD, A.M. 1938	ROSE PRÉCOCE,* A.M. 1938 (also disbudded)
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The following varieties have been discarded :

GLADSOME	MRS. WEBBER
MATADOR (not an early)	ROSALINDE
MRS. PERCY BEER* (not an early)	SARAH KNIGHT

Flowers of Salmon Shades.

Salmon Freda (raised and sent by Mr. H. Shoesmith, Mayford, Woking). **A.M.** September 28, 1939, as a disbudded variety for cutting.—3 feet, of erect habit. Flower stems 18 to 24 inches long. Flowers 4½ to 5 inches, disbudded, florets semi-rolled, inner incurved, outer horizontal, light rosy-salmon. Sport from 'Freda.'

The following varieties have been retained for comparison :

ALTHORPE, A.M. 1938	GERTRUDE, A.M. 1938
DAWN, A.M. 1938	SALMON PRÉCOCE,* A.M. 1938 (also disbudded)

The following varieties have been discarded :

GLADNESS*	SALMON PROFUSION* (not an early)
LA GARONNE*	SALMON QUEEN
MERIDIAN	SYLVIA
MRS. A. W. THORPE*	

Flowers Fawn.

The following variety is retained for comparison :

SHIRLEY FAWN, A.M. 1938

The following variety has been discarded :

APRICOT DELIGHT

Flowers of Amber Shades.

Early Marvel (raised and sent by Messrs. J. and T. Johnson). **A.M.** September 6, 1939, as a disbudded variety for garden decoration.—2½ feet, of compact bushy habit. Flower stems 15 to 18 inches long.

Flowers $3\frac{1}{2}$ to $4\frac{1}{2}$ inches, disbudded; florets semi-rolled, inner incurved, outer recurved, bright rich old gold.

Mrs. Q. Macfadyen (sent by Messrs. W. H. Simpson, Monument Road, Birmingham). **A.M.** September 19, 1939, as a disbudded variety for cutting.—3 feet, of erect habit. Flower stems 12 to 24 inches long. Flowers $4\frac{1}{2}$ to 5 inches, disbudded, incurved, rich golden-amber.

Saracen (sent by Messrs. W. H. Simpson). **A.M.** September 28, 1939, as a spray variety for garden decoration.—2 feet, of bushy habit. Flower stems 9 to 12 inches long. Flowers 3 to $3\frac{1}{2}$ inches, in spray form, pale golden-amber.

Alex. McAlpine (raised by Mr. Alex. A. McAlpine in 1921 and sent by Messrs. R. H. Bath of Wisbech). **H.C.** September 28, 1939.—2 feet, of compact bushy habit. Flower stems 9 to 12 inches long. Flowers $3\frac{1}{2}$ to 4 inches, in spray form; florets semi-rolled, bright rich amber.

The following variety has been retained for comparison:

HARMONIOUS, A.M. 1938

The following variety has been relegated to the general collection:

AMBER UTOPIA

The following varieties have been discarded:

GORGEOUS*
INEZ RITCHIE*

MRS. PETER WILSON*
REMARQUE

Flowers of Bronze Shades.

Trigo (raised and sent by Mr. W. Avery). **H.C.** September 19, 1939, as a spray variety for garden decoration.—2 feet, of compact habit. Flower stems 12 to 15 inches long. Flowers 4 inches, in spray form, somewhat incurved, bright golden-bronze.

The following varieties are retained for comparison and future judgment:

ALFRETON BEAUTY	ORION
ANNIE S. LITTLE, A.M. 1938	SANDCLIFFE BRONZE
BRONZE PRÉCOCE,* A.M. 1938 (also disbudded)	SEPTEMBER GLORY, A.M. 1938
CHAMOIS*	SPARTAN
Egypt, H.C. 1938	TIBSHELF GLORY
ORANGE GLOW, A.M. 1938	UTOPIA, A.M. 1938
MRS. JACK PEARSON,* H.C. 1938	WENDY,* A.M. 1938

The following varieties have been relegated to the general collection:

BRONZE QUEEN	MAYLAND BRONZE
EDINA	MIDNIGHT SUN
GOLDEN PHOENIX*	TITAN
HILLCREST BRONZE	WINNIE AVERY
HOLLYBANK BRONZE	

The following varieties have been discarded:

A. E. COOPER*	LUCIUS
ALFREDA	MRS. WM. WHYTE
GLORIANA	ORANGE PET*
HALO	QUERY
HARVESTER*	SUNLIT
JAMES MOODY*	WOKING BRONZE (October flowering)

Flowers of Red-Bronze Shades.

John Wearing (raised and sent by Mr. H. Shoesmith). **A.M.** September 28, 1939, as a disbudded variety for cutting and garden decoration.—3 feet, of bushy habit. Flower stems 18 to 24 inches. Flowers 5 inches, disbudded; florets stiff, somewhat incurved, bright deep scarlet-bronze with an orange-bronze reverse.

Terra-Cotta Freda (raised and sent by Messrs. G. W. Sapsford, Pevensey, Sussex, introduced and also sent by Mr. W. H. Dixson, Broadbridge Heath, Horsham, Sussex). **A.M.** September 28, 1939, as a disbudded variety for cutting.—3½ feet. Flower stems 18 to 24 inches, foliage small. Flowers 4½ to 5 inches, disbudded, between Mandarin Red, H.C.C. 17/2, and 17/1. Sport from 'Freda,' also known as 'Deep Bronze Freda.'

Brilliant (raised and sent by Mr. C. T. Kipping, Mayland, Althorne, Chelmsford, Essex). **H.C.** September 6, 1939, as a disbudded variety for garden decoration.—2½ feet, of compact bushy habit. Flower stems 15 to 20 inches. Flowers 4 to 4½ inches, disbudded, bright reddish-bronze with a pale yellow reverse.

Dictator (raised and sent by Messrs. J. and T. Johnson). **H.C.** September 6, 1939, as a disbudded variety for garden decoration.—2 feet, of bushy habit. Flower stems 12 to 15 inches. Flowers 4½ inches, light scarlet-bronze with a bright old-gold reverse.

The following varieties are retained for comparison and future judgment :

BRONZE BEAUTY, A.M. 1938	DOROTHY MAQUIRE, A.M. 1938
CHESTNUT GEM*	MRS. PHIL PAGE,* H.C. 1938
CHESTNUT GLORY	

The following varieties have been relegated to the general collection :

BRONZE EARLY BUTTERCUP	HAZELMERE*
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The following varieties have been discarded :

BONA HANNA*	TANCRED GEM
BEN	

Flowers of Red Shades.

Carnival (raised and sent by Mr. H. Shoesmith). **A.M.** September 28, 1939, as a disbudded variety for garden decoration.—2 feet, of compact bushy habit. Flower stems 9 to 15 inches long. Flowers 4½ inches, disbudded, bright scarlet terra-cotta with a bright golden reverse.

Coppella (raised and sent by Messrs. J. and T. Johnson). **H.C.** September 28, 1939, as a disbudded variety for garden decoration.—2½ feet, of bushy habit. Flower stems 18 inches. Flowers 4½ to 5 inches, disbudded, bright, lively coppery chestnut.

The following varieties are retained for comparison and future judgment :

CHALLENGER, A.M. 1938	MAYLAND FLAME, A.M. 1938
CHESTNUT PRÉCOCE	ROYAL SALUTE,* H.C. 1938
E. CROSSLEY	RUFUS, A.M. 1938
JOHN WOODIN	

EARLY-FLOWERING CHRYSANTHEMUMS AT WISLEY, 1939. 39

The following varieties have been relegated to the general collection :

ARDENT
PHOENIX*

CRANFORD RED*

The following varieties have been discarded :

BRUCE*
CHIEFTAIN*
CYRIL COLEMAN (not an early)
DAILY EXPRESS
FIRE CREST* (not an early)
GARDEN RED*
GIANT PAGE
JENNY McALPINE*

MAGNETIC
REDCAP
REVELLER
SEPTEMBER RED
TIGER
WARRIOR*
WEALTHY*
WELCOME*

Flowers of Crimson Shades.

Beauchief (raised by Messrs. J. and T. Johnson and sent by Messrs. Torrance and Hopkins, Busby, near Glasgow). **A.M.** September 6, 1939, as a disbudded variety for garden decoration.—2½ feet, of bushy habit. Flower stems 18 inches. Flowers 4½ to 5 inches, disbudded, incurved, rich crimson, with bronzy old-gold reverse.

Clara Ward (raised by Mr. C. P. Ward and sent by Messrs. A. G. Vinten, Balcombe, Sussex). **A.M.** September 21, 1938, as a spray variety for market and garden decoration; also sent as 'Crimson Page' by Messrs. Isaac Godber, Bedford, and 'Mrs. Douglas Foxwell' by Mr. D. Foxwell, Balcombe, Sussex : these share the award.—3 feet, of compact upright habit. Flower stems 12 to 20 inches long. Flowers 3½ inches, in spray form, reddish-crimson.

Gladiator (raised and sent by Mr. H. Woolman). **A.M.** September 19, 1939, as a disbudded variety for cutting.—3½ feet, of compact bushy habit. Flower stems 18 to 24 inches long. Flowers 4 inches, disbudded, a deeper and richer tone of Turkey Red H.C.C. 721, with a Lemon Yellow reverse H.C.C. 4/2.

Vulcan (raised and sent by Messrs. J. and T. Johnson). **A.M.** September 6, 1939, as a disbudded variety for market.—3 feet, of compact bushy habit. Flower stems 15 to 22 inches long. Flowers 4½ inches, disbudded, somewhat incurved, rich crimson with a dull old-gold reverse.

Toreador (raised and sent by Messrs. J. and T. Johnson). **H.C.** September 28, 1939, as a disbudded variety for cutting.—3 feet, of erect bushy habit. Flower stems 18 to 24 inches long. Flowers 4½ to 5 inches, disbudded, scarlet-crimson with a dull old-gold reverse.

The following varieties are retained for comparison and future judgment :

ALETTA
ARCIAN*
BRILLIANCE,* A.M. 1938
CRIMSON CIRCLE,* A.M. 1938
ENDEAVOUR, A.M. 1938

INDIANA, A.M. 1938
JIM TOMLINSON
SIGNAL, A.M. 1938
RED CRUSADER, A.M. 1938
VALIANT, A.M. 1938

The following varieties have been relegated to the general collection :

A. J. COBB
ADVENTURE
COURAGEOUS

FANFARE
RED QUEEN
RED ROVER*

The following varieties have been discarded :

ARDENT	R. G. COLLCOT
CONQUEROR	RED INVADER
CRIMSON GLORY	RED KING
ÉTINCELANT	ROBIN*
JIM THORPE*	TOPSY*
MAYFORD RED	W. M. WOODFUL
MAYFORD RED SPORT	WEST BOURNE

Flowers of Ruby-Crimson Shades.

The following varieties are retained for future judgment

CRIMSON SPLENDOUR	MAYLAND RED
BRILLIANCY*	

The following varieties have been discarded :

CLARION	DICK BARNES*
CRIMSON ZINNIA*	WEMBLEY*
DARKNESS*	

Flowers of Purple Shades.

Petunia (sent by Mr. H. Woolman). **H.C.** September 28, 1939, as a disbudded variety for cutting and garden decoration.—3 feet, of compact habit. Flower stems 15 to 18 inches long. Flowers 4½ inches when disbudded, rounded, magenta **H.C.C.** 27.

The following varieties are retained for comparison and future judgment :

PURPLE KING	ZENITH, A.M. 1938
VELVETEEN, A.M. 1938	

The following varieties have been relegated to the general collection :

ELSIE HAYNES CARTER	LICHFIELD PURPLE
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The following varieties have been discarded :

ROYAL PURPLE	Yo-Yo*
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BOOK REVIEWS.

"Science lends a hand in the Garden." By Sir Frederick Keeble, F.R.S. x + 307 pp. (Putnam, 1939.) 10s. 6d.

For years lovers of their gardens have turned week by week to the leading article of the *Gardeners' Chronicle*, anticipating something that would certainly interest and probably amuse, something also that might be well worth thinking over and acting upon. And now Sir Frederick has collected these engaging discourses into a volume. The articles have been gathered together to form chapters, each dealing more or less with a single aspect of gardening—the soil, disease, fertilizers, cultivation and so on—but the circumstances of its origin prevent the book from being a consecutive treatise on the science of gardening. Indeed Sir Frederick recommends the reader to take a chapter at a time and suggests that a little doze may well follow, but the note of the book is stimulus rather than sleeping draught. For Sir Frederick is a unique personality in his combination of weighty scientific equipment and gardening experience; his writing is illustrated by an aptness of quotation that comes of much reading, and lightened at times by an impish irreverence. The reader will find in this book the results of recent research into the growth of plants presented with such ease and intelligence as make it available to the ordinary reader—"Divine philosophy, not harsh and crabbed as dull fools suppose." It may be that here and there a qualification or an extension might be inserted because of progress since the article was written, but these are small matters in a book that is not intended for the professional man of science but for the intelligent lover of a garden who wants to know something of how the wheels go round. A book to enjoy.

"Old-Fashioned Flowers." By Sacheverell Sitwell. 4to. 193 pp. Ill. (Country Life, London, 1939.) 15s.

It is a matter of congratulation that so accomplished a writer as Mr. Sacheverell Sitwell should remind the gardeners of to-day of the old Florist's flowers and the enthusiasts who produced them. He recalls famous men like the Rev. F. D. Horner and his invariable coadjutor, Ben Simonite; also Sam Barlow, colour printer by trade, patron of the Manchester school of painters as of the Lancashire working men florists, who handed on his love of colour to his two nephews, J. T. Bentley and C. W. Needham. Bentley bred and showed Auriculas and Tulips; Needham grew Tulips, Gold Laced Polyanthus and Laced Pinks. Mr. Sitwell has sought his information from the Midland Florist, that great repository of information about the early working-men fanciers and the shows that were held, mostly in public houses in the industrial towns of the North and the Midlands, even in the Horns Tavern in Kennington, the last home of the London fanciers. The Midland Florist began about 1840 and after one or two changes of name finally disappeared in the 'sixties. Mr. Sitwell has also been a collector of those finely illustrated books of the first half of the eighteenth century of which the best known is probably the *Horticultural Cabinet*, but he does not mention the best of all these picture books—the two volumes of *Sweet's Florists' Guide*. He might also have obtained the answer to some of the questions he asks from the series of articles on the English Tulip which J. W. Bentley contributed to the *Journal of Horticulture* in 1894-95, or even from the List of Tulips drawn up by this Society. Mr. Sitwell's enthusiasm is delightful; one should read his account of his first falling for the Show Auricula, how he has caught the feeling for "quality" in the texture of the petal which was the mark of all the old florist flowers—Carnation, Auricula and Tulip. We wish we could share his enjoyment of his illustrator's renderings of these ancient beauties; we find them rather crude fantasias on the old themes, lacking above all in the "quality" the florists put foremost.

"Gardens of Character." By Marion Cran. 8vo. 284 pp. + xii. Ill. (Herbert Jenkins, Ltd., London, 1939.) 10s. 6d.

Those who are content to seek their gardening information among a myriad of irrevelancies will be enchanted with Marion Cran's latest work. It is a garden novel in her best style.

"Diseases of Bulbs." By W. C. Moore. Bulletin No. 117. 8vo. 176 pp. Ill. (H.M. Stationery Office, London.) Stiff covers, 4s.

In common with the majority of Ministry of Agriculture and Fisheries Bulletins, this book is a valuable aid to the commercial grower of bulbs and is also of interest to the private gardener. Comprehensive and easily understood, it is written mainly for the practical reader. With this thought in mind it may appear strange that chapters on the nomenclature and history of the various diseases should have been included. However, the information that the commercial grower wishes to find is set out conveniently for easy reference and should find a ready welcome from those engaged in this increasingly important industry.

"Propagation of Horticultural Plants." By Guy W. Adriance and Professor Fred R. Brison. 8vo. 314 pp. Ill. (McGraw-Hill Publications in the Agricultural Sciences. New York and London, 1939.) Price 20s.

This new text-book surveys in three hundred pages the methods used in American nurseries and gardens to multiply many plants. The authors first describe in simple terms the structure and function of plant organs. They then devote chapters to propagation by seeds, layers, cuttings, grafts, and other methods. In another chapter the authors deal specifically with Cherry, Citrus, Peach, Pear, Plum, many Nuts and bush fruits, as well as Avocado and Persimmon, together with Conifers, Roses and various other shrubs, among decorative plants.

Unfortunately, too frequent use is made of American common names for plants, and this may confuse English readers; as in the legend to fig. 106, "Upper part of this tree is live oak, top worked on to a post oak." All Apple growers will not agree with the statements on pp. 222-3, where, discussing rootstocks raised by vegetative methods and classified by the East Malling Research Station, the authors state that "Results in England and in this country indicate that trees on such stocks show slightly less variability than others on seedling roots, but on the whole the difference has not been so great as anticipated." "Slightly" might well be omitted.

There is a useful chapter on the relationship between the methods of propagation and the incidence and spread of American pests and diseases.

The index would be improved by inclusion of the Latin names for the plants mentioned in the text.

Throughout the descriptions are brief and direct, and all the methods described are fully illustrated. Modern methods are employed and the necessary apparatus and equipment are adequately discussed. References are also given to current research on the problems involved.

M. A. H. TINCKER.

"The World of Plant Life." By Clarence J. Hylander, Ph.D. 4to. xxiv + 722 pp. Ill. (Macmillan, New York, 1939.) 32s. 6d.

Under this impressive title the author presents in popular form an immense amount of information concerning plants to be found growing in the U.S.A. "This book," he states in the preface, "was planned and written with the specific purpose of making the layman familiar with a few of the interesting plants, both native and introduced, which are found in the United States," and he expresses the hope that the book may also be of assistance to students of plant life and to horticulturists.

Of the "few" interesting plants to which the author modestly refers, about two thousand, more or less, are mentioned in the text with brief descriptions and notes on habitat and economic products. Nearly one-half of this number are illustrated by small line-drawings, some of which are adapted from earlier works, while nearly two hundred plants of special interest are given whole-page half-tone plates.

The scope of the work is wide, and every type of vegetation from the bacteria upwards comes under review. An adequate introductory chapter tells how plants live and multiply, comparing their life-processes with those of animals, and gives a clear outline of the classification of the vegetable kingdom. In the forty-six chapters forming the body of the book families are considered in their taxonomic sequence, and related groups are dealt with in their proper position from the botanical viewpoint. Many families of minor importance have, of necessity, been omitted. Plants of specialized physiological attributes, such as parasites and saprophytes, are grouped in a single chapter for convenience of study; aquatic seed-plants are given similar treatment.

N. K. GOUAN.

JOURNAL OF THE ROYAL HORTICULTURAL SOCIETY

Vol. LXV



Part 2

February 1940

THE SECRETARY'S PAGE.

WITH the passing of the long winter the awakening of the interest in our gardens grows, and so it is with the Society, for the first Fortnightly Show of the year will be held on February 20 (12 noon to 6 P.M.) and 21 (10 A.M. to 5 P.M.), and it is sure to be a very welcome gathering under the aegis of the first signs of spring.

The Annual Meeting of the Society will be held at 3 P.M., in the Lecture Room, on February 20, when the President will give an account of its past year's work and outline its work for the coming year. The Report and the accounts are published on pp. i-xxi and the agenda of the meeting will be found on the enclosed fly-leaf.

The talks on "Some Plants in the Show" proved very popular last year and the practice will be continued this year. The first such talk will be on February 21, at 3 P.M., in the Lecture Room, and will be given by Mr. C. H. Curtis, the Editor of the Gardener's Chronicle, and on the second day of each Fortnightly Show arrangements will be made for some prominent speaker to give such a talk.

The second Fortnightly Show of the year will be on March 5 (12 noon to 6 P.M.) and 6 (10 A.M. to 5 P.M.), and on March 5, at 3 P.M., Dr. Taylor will lecture on "Food from the Garden—Schemes for an Increased Production." The talk on the second day will be given by Mr. T. Hay.

A Fortnightly Show will be held on March 19 (12 noon to 6 P.M.) and 20 (10 A.M. to 5 P.M.), and on this occasion there will be a special feature of Alpines in co-operation with the Alpine Garden Society.

In the afternoon of March 20, at 3 P.M., Captain Kingdon Ward will lecture on his recent plant hunting in Assam and the Eastern Himalaya.

PRACTICAL DEMONSTRATIONS AT WISLEY.

At Wisley the demonstrations will be continued, and in March the following will be given :

March 6 and 7, 2 to 4 P.M. (weather permitting) :
Seed Sowing.

March 14 and 15, 2 to 4 P.M. (weather permitting) :
Rose and Shrub Pruning.

Those people who desire to attend should notify the Director of the Gardens.

SUBSCRIPTIONS.

It is an unpleasant task and duty of the Secretary to remind Fellows that their subscriptions fell due on January 1, but it must be appreciated that the work of the Society can only be carried on with the full support of its Fellows, and that the payment of the annual subscription is necessary for participation in the plant distribution.

APPLICATIONS FOR SURPLUS SEEDS AND PLANTS.

In the January JOURNAL application forms and lists of seeds and plants were distributed and these should be returned before March 9 by those Fellows who desire to make use of this service.

THE LILY GROUP.

The Lily Group will be continued. It was formed in 1933 and has increased in popularity yearly. It is hoped it will not suffer from the present circumstances and that its useful work will be carried on.

There is every intention of publishing the LILY YEAR Book (as also the DAFFODIL YEAR Book).

All Fellows of the Society may attend the meetings of the Lily Group, and notices of the meetings are obtainable from the Secretary; the following interesting programme has been drawn up for this year :

Tuesday, April 30.

Discussion at 4 P.M., in the Restaurant of the Old Hall, on "Plants to Associate with Lilies." Opening speaker—Mr. G. C. Taylor.

Tuesday, June 18.

Question and Answer Meeting, at 4 P.M., in the Restaurant of the Old Hall.

Saturday, July 6.

Visit to the Royal Botanic Gardens, Kew.

Tuesday, July 16.

Discussion at 3 P.M., in the Lecture Room of the New Hall, on "The Lilies Exhibited." In the evening Members of the Group and their friends to dine in the Restaurant of the New Hall, the dinner to be followed by a Discussion.

Tuesday, September 24.

Discussion at 4 P.M., in the Restaurant of the Old Hall, on "The Root System of Lilies." Opening speaker—Dr. M. A. H. Tincker.

There will be Lily Competitions on July 2 and 16, particulars of which can be obtained on application to the Secretary.

THE JOURNAL.

The Secretary has been sorry to receive a number of complaints about the delay in the receipt of the JOURNAL, especially in these latter months. There have, however, been considerable difficulties, not of its own making; the double change of Editorship and the war have been the unavoidable causes of these delays. It is hoped, however, now with the reorganization that the delivery of the JOURNAL will be more punctual, but it must be remembered that in reading these notes about the Society's arrangements on these pages that they will be written on purpose to overlap so that information should always be available to the Fellows in case of delay in the delivery of the JOURNAL.

THE LINDLEY LIBRARY.

The Fellows are particularly asked to note that owing to the war circumstances the Library service is being maintained. The Assistant Librarian will always be on full time duty on the days of the Fortnightly Shows, from February 20, and on other days from 2.15 P.M. onwards.

1. The right of closing the Library at any time for purposes of re-arrangement, cleaning, etc. is reserved. It will be closed annually for two weeks, usually between the first and second fortnightly meetings of the Society in July, in order that the books may be cleaned and the stock inspected. During this period Fellows will be able to consult books but not to borrow them.

2. The Fellows of the Society have access to the Library at all times when it is open.

3. Gardeners and others, not Fellows or Officers of the Society, must make application to the Secretary for permission to use the Library, and must enter their names and addresses in a book provided for that purpose.

4. Anyone requiring the loan of a book to be taken from the Library must make written application to the Secretary, and loans will be granted on the following conditions, viz. :—

- (a) That the borrower be personally known to one or more of the Officers of the Society, or produce satisfactory references.
- (b) That the borrower sign a receipt for the volumes in a book provided for the purpose, before removing them from the premises, or if unable to attend, to acknowledge the receipt

- on a postcard ; and undertake to restore the books in good condition and to comply with the regulations.
- (c) That not more than three volumes be lent to one person at one time.
 - (d) That borrowers through the post pay the postage both ways.

PANEL OF LECTURERS.

The panel of lecturers which the Society is forming in conjunction with the Ministry of Agriculture has made very satisfactory progress, and many Fellows have offered their services, which have been gratefully accepted. There are, however, certain counties where the panel requires considerable strengthening, especially in Bedfordshire, Derbyshire, Devonshire, Durham, Northumberland and Wales with the exception of Glamorganshire. A number of lectures have been arranged for the coming months, and it is hoped that the affiliated societies will make full use of this method of obtaining lecturers on the important subject of food production.

SEVENTH INTERNATIONAL BOTANICAL CONGRESS.

The Seventh International Botanical Congress which was to be held in Stockholm in 1940 has been postponed.

HALL LETTING.

The New Hall has been let from February 8 to 10 for a Cage Birds Show on behalf of the Red Cross Society, and further particulars can be obtained from F. W. Batchelor, Esq., c/o Messrs. Poultry World, Ltd., Dorset House, Stamford Street, S.E. 1.

WISLEY IN FEBRUARY.

On entering the Gardens the visitor will be welcomed by the delightful lavender-blue flowers of the Algerian *Iris unguicularis* (*I. stylosa*) pushing up in the clumps of foliage under the south wall of the Laboratory—an admirable flower for associating with the Winter Jasmine (*Jasminum nudiflorum*) when brought into the house. On the west side, by the main door, the large old tree of *Acacia dealbata* is expanding the fluffy balls of "Mimosa" which annually appear in great profusion in this sheltered corner.

In the half-hardy house, down the steps, one of the prettiest plants now in bloom is *Lithospermum rosmarinifolium* from the cliffs of Capri, with flowers of brilliant blue ; it is, unfortunately, not hardy outside in our Wisley climate. *Clematis cirrhosa* is another Mediterranean native which is to be found climbing up one of the supports and at this season is hung with pendent white bells, but is hardier than the *Lithospermum* and may be grown outside in a selected spot. Another interesting and flowery shrub in the house is *Cassia stipulacea*, with clusters of bright orange, Pea-shaped blossoms ; the large waxy

brownish-orange bells of the African *Canarina campanulata* are also to be seen here, neighbouring the paler yellow heads of the South African bulb *Cyrtanthus lutescens*.

The many modern varieties of *Primula malacoides* on trial in the second house are a revelation of the way in which this once pale and small-flowered species from China has developed in recent years through selection in the hands of patient cultivators. Cinerarias are the principal feature to follow the Primulas.

Passing on to the large Temperate house we find a much greater range of shrubby plants in flower, and the latter part of this month or early in March is, in fact, one of the best seasons in which to see the occupants of this house at their most attractive stage. Species and varieties of *Camellia*, *Erica* (the South African Heaths), the very similar *Epacris*, and Acacias from Australia form a great part of the display and are especially ornamental, but in addition to these may be seen the rosy-pink *Correa speciosa* with long-tubed flowers, the lovely and fragrant, Asiatic *Luculia Pinceana* with heads of soft pink, the white *Loropetalum chinense*, of the same family and having the same type of flowers as the *Hamamelis* but much less hardy, contrasting pleasantly with the buff heads of *Pomaderris apetala* beside it, and finally that profusely-flowering climber *Tecoma australis* must all be mentioned. Visitors will, however, discover for themselves other noteworthy plants among this large collection.

In the pans in the Alpine house some of the earliest bulbs are now blooming. These include *Galanthus Elwesii*, *Narcissus asturiensis*, *Iris reticulata* var. *Cantab*, *Scilla Tuberigeniana*—a recently introduced and promising species from northern Iran with palest mauve flowers—species of *Cyclamen* such as *C. coum* and *C. vernum*, together with the various forms and varieties of the precocious *Saxifraga Burseriana*, now so many in number. In the adjacent beds and frames is a number of *Crocus* species braving the early spring weather—*C. susianus*, *C. Tomasinianus*, *C. aureus*, and *C. corsicus* among them—besides the light blue bells of *Hyacinthus orientalis*, the progenitor of the modern Hyacinth, and the apple-green to creamy-white heads of the Hellebores, *H. corsicus* and the hybrid *H. nigercors*, to be found outside in the border to the west of the Alpine house.

A few flowers are already beginning to make their appearance in the rock garden as it slowly awakes from its winter rest. That fine Snowflake, *Leucojum vernum* var. *Vagneri*, is one of the most noticeable with its large and pure white bells, and near to it is the excellent hybrid *Eranthis Tuberigeniana*, superior to either of its parents in size and tint of flowers: lower down the slope are *Galanthus latifolius*, and a fine tall specimen of the tree Heather, *Erica lusitanica*, whose innumerable white bells are touched with pink before opening.

Some notable shrubs flower at this time in the Wild Garden, the chief being, perhaps, *Mahonia japonica*, whose long, scented yellow spikes begin to open in December and continue for many weeks; the glossy, pinnate foliage is decorative at any season. Another is

Hamamelis mollis, equally blessed with fragrance and the more conspicuous because the rich gold flowers appear on the leafless branches ; its relative, *H. japonica*, has paler and smaller blossoms but is none the less welcome in the month of February. A smaller evergreen shrub, likewise sweetly scented, is *Daphne hybrida* (*D. Dauphini*), with tubular, rosy-pink flowers in clusters at the end of the shoots. It is well suited to the rock garden.

Proceeding into Seven Acres we can see many splashes of colour among the Heathers, where the several varieties of *Erica carnea* are at the height of their beauty—' King George,' *praecox rubra*, ' Queen Mary,' and ' Springwood White ' among them. Other species now flowering are *E. mediterranea* var. *hibernica*, *E. lusitanica* already noted on the rock garden, and that indispensable hybrid *E. darleyensis* which grows so well and flowers so freely in almost any soil or position. Among the shrubs in this part of the Gardens the Winter-Sweet, *Chimonanthus fragrans*, will scarcely be noticed for its dull flowers, but for their rich and penetrating scent. Three plants about five feet high form a group in the south-western corner near a very large specimen *Exochorda*. Here too, is the earliest Forsythia, *F. Giraldiana*, introduced from Kansu, northern China, by REGINALD FARRER, in 1914-15. The bells are of a pale soft yellow, freely produced. Beside the pond the silky catkins of some of the Willows become visible—*Salix gracilistyla*, and *S. acutifolia*, and along the river bank *I. daphnoides* with purple bark and silvered buds. An unusual but most ornamental *Prunus* tree is in bloom near the eastern end of Seven Acres, *P. Conradi*nae, var. *semi-plena*, with quantities of semi-double, pale pink flowers borne on the bare branches.

In the Award of Merit garden two other fragrant shrubs must not be overlooked, as both are of the greatest value for early flowers ; they are *Viburnum fragrans*, about six or seven feet high, bearing pale pink clusters of bloom, and the well-known *Daphne Mezereum*, of which there is a particularly rich-coloured form in this position.

THE KITCHEN GARDEN IN FEBRUARY.

PROVIDED the soil and weather conditions are favourable, sowings may be made towards the middle of the month of a round-seeded variety of Pea and an approved variety of Broad Bean. A warm situation should be chosen for these crops, and the success of these early sowings will, of course, largely depend upon the luck of the weather. But at the worst only the seed will be lost.

Towards the end of February round-seeded Spinach and Onions may be sown in suitable situations, and plantings may be made of Jerusalem Artichokes at any time during the month.

The work of digging, if not completed, should be pressed forward, as the returns from land dug early in the season are always better than from land hastily turned over just before the crops are sown.

All refuse that cannot be rotted down should be burned and the ash placed direct upon the ground. If this is impracticable it should be stored in a dry place.

The practice of liming soil is often neglected, and the present month is opportune for rectifying any deficiency in this respect. Useful information on this subject is to be found on pages 32 and 33 of the R.H.S. Gardeners' Diary, where directions are given for testing the soil if there is any doubt about its lime content. Ground intended for crops of Brassicas especially may be in need of lime and a dressing of 25 lb. of hydrated lime to the rod ($30\frac{1}{2}$ sq. yards) should be applied to the surface when it is fairly dry.

Although the operation of digging Celery trenches is often delayed until later in the year, February is a good month to do this work and the ground between the trenches may be utilized later for growing crops of Lettuces or French Beans. Ground which has just been cleared of Cabbages is excellent for Celery.

For many vegetables a little additional potash fertilizer is desirable, and ground that for any reason is not to be dressed with farmyard manure this year could with advantage receive an application of the following : 3 lb. of superphosphate, $1\frac{1}{2}$ lb. of sulphate of potash and 1 lb. of sulphate of ammonia, worked into each rod of ground during February. Later, say after root vegetables have been thinned, a further dressing of 1 lb. of sulphate of ammonia per rod, hoed into the ground between the crops, will give an additional fillip to the growing vegetables when it is most appreciated by them. Vegetables grown with a full supply of nitrogenous manure are always softer and more tender, which is all right for the householder but not desirable when they have to travel to market.

Sowings of Cabbage Lettuces, Radishes, Turnips and a suitable variety of Carrot may be made during the month in frames over mild hotbeds ; early maturing Cabbages and Cauliflowers may also be sown under glass in slight heat to provide plants for planting when thoroughly hardened in April. If the frames or greenhouses used for these Brassicas are heated, so much the better, but sowings made even in unheated glass structures will prove earlier than plants raised in the open.

All vegetables that are being kept in store should be examined periodically ; any that are beginning to decay should be removed as it is important to maintain the supply of stored vegetables for as long a period as possible and any growth shoots should be rubbed off.

Parsnips that have been allowed to remain in the ground should now be lifted and placed in a cold position against a north wall to retard the growth which will already be commencing.

In the parts of the garden devoted to fruit trees or bushes the work of cultivating the ground should be pushed forward, and if manure is available and required by the trees it should be placed around them as a mulch. All trees on arable land will benefit by a dressing of 1 oz. of sulphate of potash worked shallowly into each square yard

of soil. In grass orchards leaves and other refuse should be raked up and the orchard left clean and tidy, because fallen leaves are often carrying the spores of disease. There is such a thing as garden hygiene, though it is often neglected. Grease bands should be inspected and kept sticky. All pruning should be finished before the buds commence to burst and the thin tips of summer fruiting Raspberry canes should be cut back to the stout firm wood. All stems of newly-planted Raspberry canes should be cut down to within six inches of the ground and all canes of the autumn fruiting varieties should be cut down to the ground level.

A FEW HERBACEOUS PLANTS RECENTLY INTRODUCED TO GARDENS.

By R. L. HARROW, V.M.H. (Wisley Gardens).

THE numbers of really noteworthy plants of a herbaceous character, such as are usually accepted as plants for the Herbaceous Border, which have been introduced to gardens during the last few years, are comparatively small, and those mentioned below are a few whose worth has been recognised by the Royal Horticultural Society, either after being tried at Wisley or after exhibition at Vincent Square. They might well be considered by those who may be selecting a few plants which have more recently appeared on the market.

A rather uncommon plant in cultivation is *Strobilanthes atropurpureus*, which attains a height of about three or four feet, and is of compact growth; the flowers, which are usually borne in pairs, are tubular and nearly two inches in length, bluish in colour, and are produced over a considerable period. In its native habitat of the Western Himalaya this perennial is said to grow at an elevation up to 10,000 feet and is perfectly hardy. To those who admire plants bearing flowers of a Sunflower type, *Heliopsis gigantea*, with its striking flowers, the ray florets of which are about five inches across and bright Indian yellow in colour (fig. 12), can be recommended for consideration.

For freedom of flowering and the long period over which blooms are produced *Physostegia virginiana intermedia rubra* should be grown. It is rather taller than the variety Vivid, now so popular in gardens, as it reaches a height of between two and three feet. The flowers are of a bright rosy purple colour with a white throat. It is not fastidious in its requirements as to soil, and good clumps are easily obtained in any good garden soil. *Salvia farinacea* Blue Bedder, if given a good sunny position, will well repay any trouble taken to secure good plants which are of compact habit. A group when in full flower with its erect, long spikes of distinctive, lavender blue blossoms in the whorls so common to the genus *Salvia*, are a generally admired object of the border.

To those desiring bold flowers of almost monstrous size the Shasta

Daisy *Chrysanthemum maximum* Everest, should fit the requirement. Growing to almost three feet in height, the large heads of flowers are almost five inches in diameter, freely produced at the apex of stout stiff stems. Another popular variety of the Shasta Daisy must not be omitted—Pauline Read, which has double creamy-white flowers, very freely produced and extremely useful for decoration purposes. As a plant to occupy a front position in the border, a few plants of *Fuchsia Tom Thumb* will be found useful and suitable on account of its dwarf, almost globular, habit of growth of from one to two feet in height and extremely floriferous, continuing to bloom until checked by frost. The flowers have rosy-cerise sepals with petals of a rich purple tone. Another dwarf plant is the variety Wendy of the herbaceous *Veronica incana*. At all times conspicuous for its bright grey foliage, it is also valuable for a frontal position, growing as it does not more than a foot in height; the numerous inflorescences are branching, bearing campanula violet coloured blooms.

The genus *Phygelius* is familiar in many gardens through *Phygelius capensis*, commonly known as the Cape Fuchsia, but the other species *P. aequalis*, although very deserving, is certainly not often seen and should be tried if procurable. In comparison with *P. capensis* it is dwarfer and of a semi-shrubby habit. The plant has been exhibited by VISCOUNTESS BYNG OF VIMY, in whose garden the photograph reproduced in fig. 11 was taken. *Campanula persicifolia* Frances is a vigorous, distinct variety of this well-known species, which should be better known. It is very free flowering and is remarkable for the lavender coloured flush running through its petals. While of easy cultivation it may be rapidly increased by division.

For a sunny, dryish position *Centaurea dealbata* var. *Steenbergii* is an excellent subject. The flowers are described as being of a greyed hue of Orchid purple, much deeper than that which is found in the type species. In cultivation it grows to about three feet in height. It is said to have originated in a nursery in Sweden. For a contrast in the colour of flowers to the above, another species, *Centaurea glastifolia* with yellow flower heads, may be planted; both will thrive under similar conditions. Although not an uncommon plant, *Anthemis Sancti-Johannis* has not yet found the full measure of recognition in gardens that is its due. Fig. 13 shows admirably how effective a bold clump of this deep rich golden Composite can appear when given a suitable corner position in a collection of herbaceous plants. This, and certain other members of the Anthemis family, notably *A. tinctoria* Perry's Variety, are well worth including if only for their value as cut flowers as they supply a succession of blossoms over a long period in the summer months. The majority of the above-mentioned plants have had the advantage of being tested for their garden value and have received the Award of Merit or other acknowledgement of their worth.

PLANTS TO KEEP IN MIND.

DRACOCEPHALUM STEWARTIANUM.

By G. H. PRESTON.

(The Royal Botanic Gardens, Kew.)

ALTHOUGH this is by no means a new plant it is only now beginning to be recognized as one of the most attractive members of the genus and well worthy of extended garden cultivation. It received an Award of Merit on August 1, 1939, and a bed of it grown at Kew in 1939 was very much admired (see fig. 17).

It was first described as *Nepeta Stewartiana* by DIELS from material collected by the late GEORGE FORREST in September of 1904 on his expedition to Yunnan and Eastern Tibet, who found it in the valley of the Sung Kwei, growing at an altitude of from 8,000 to 10,000 feet.

The same collector found it again in 1906 on the eastern flank of the Lichiang Range, growing on grassy openings in pine forests at an altitude of 11,000 to 12,000 feet.

Some time later the name was changed to *Dracocephalum Stewartianum* by DUNN, the two genera *Dracocephalum* and *Nepeta* being very closely allied.

The plant grows from 3 to 4 feet high and has dark-green, broadly lanceolate-serrated leaves on long, slender, erect stems, with whorls of large, deep-purplish blue flowers, the inside of the corolla being irregularly striped and spotted with a darker shade of blue. The whole plant has an aromatic scent.

It is a first-rate plant for the herbaceous border, being a good perennial and quite hardy; it also looks very effective when grown in an isolated bed.

Commencing to flower in July, it continues to bloom freely until late in the autumn; covering such a long flowering period makes it a valuable garden plant and it will succeed in any good, well-drained soil in full sun.

It can be readily propagated by division of the root stock when new growth commences or by cutting takes from young growths in spring, which root freely if placed in sand in a close frame.

These young plants would be ready to plant out to give a display the same season. It can also be raised from seed, which is freely produced in the late autumn and which should be sown as soon as ripe.

GARDEN MAKING FROM OLD PASTURE.

By Sir A. D. HALL.

ONE is often asked what is the best way of making a new garden out of a grass field, how can one best deal with the turf? Of course there is no single answer, so much depends upon the nature of the soil and the way the grass has been managed. The result again of any method will hang a good deal upon the luck of the weather, which is quite able to convert the best devised plan into one most unsuited to the actual conditions. There is, however, one item common to all soils, and that is the examination of a trial hole or two in order to ascertain the character of the material and how it changes with depth. One digs a trench about 1 foot wide and 4 feet deep with one vertical face, opposite to which the other end is sloped off sufficiently to allow one to work. The vertical face should be carefully examined to see (1) at what depth the soil changes to subsoil; (2) if there are any layers of hard pan or clay that will impede the drainage; (3) if there is any waterlogging or gravel layers too near the surface. More about the soil can thus be learnt from the study of its "profile" than from any chemical analysis, although it is desirable to test the soil for acidity or alkalinity at such depths as show any change in material. Notice especially how the roots and the worms traverse the soil; if the roots can be traced branching freely to a depth of three feet or so one need have no doubts of the healthiness of the soil for garden cultivation or fruit growing.

The first question is how to deal with the turf. If the acreage is large the farmers' way is the only one—to plough, turning the furrow slice completely over in order to kill the grass as much as possible by burying it. A good dressing of lime will help the sod to disintegrate, but if it is one of those sour mats that peel off under the plough like a carpet it may not be possible to break it up during the coming summer and the best treatment is to sow grass seeds and a little rape on the back of the sod and attack the new sward a year or two later. But that is agriculture or even reclamation, and we are concerned rather with the smaller areas for a garden that can be dealt with by hand labour.

The farmer looks to kill the grass and weeds by drying out, but that involves some delay and it is quicker and more certain to begin by removing the turf and stacking it at the side to be dealt with later. Digging can then begin, to what depth depends upon the soil. The labour of trenching is mostly wasted when the soil is light and sandy into which roots can penetrate freely, but on a heavy clay soil full trenching—two spits dug and the third broken up, the top layer being kept on top—is a necessary preparation for a garden. This deep digging is a laborious affair, needing close supervision if the work

is let out ; there was a Cambridge don who, having made a contract to have his future garden dug to a depth of three feet, had a sounding tool constructed—a rapier-like blade with a crosspiece at three feet—and with this he tested the depth to which the ground had been moved before paying. On a free working loam it will be sufficient to move only to the depth of one spit, forking up the layer below. On the heavy soils it is wise to incorporate any sort of rubbish—hedge clippings, old straw, etc.—at depth, but it is wasteful to use good dung for this purpose. If the land is going to be a fruit plantation deep digging provides the opportunity to incorporate basic slag and ground chalk or limestone, 2 oz. to $\frac{1}{2}$ lb. of each per square yard, forked in at the lowest level.

Assuming that the digging can be finished before the winter is over the ground should be left rough in ridges in the hope that late frosts will carry on the task of cultivation and making a tilth. There is no reason, except weeds, against taking a crop in the first season after breaking up, and the orthodox procedure is to plant Potatos, which gives time for a fair amount of working of the soil preparatory to the crop and of hoeing between the rows for some time afterwards. But if it is desired to get the land ready as early as possible for general garden use and if, too, it is light and therefore weedy, a trial may be made of cyanamide as a weed-killer. As soon as the ground is beginning to warm up dress it heavily with cyanamide, 2 oz. to the square yard, which will repress and kill pretty well all the annual seeds as they germinate and at the same time will go to build up a reserve of fertility in the soil. Indeed, newly broken grassland should always be heavily manured, otherwise the decaying roots and stubble will be competing with the crop for what available fertility the soil carries. After a month or so the cyanamide will have spent its force, the surface can be cultivated and sowing or planting go on.

There remains the treatment of the turf that has been taken off and stacked. It was an old practice on heavy land to burn the sod as soon as it was dry enough ; " paring and burning " or " denshiring " (?Devon-shiring) finds a place in the old books and is still practised in odd places, the paring being done by a foot plough pushed by the body. Science frowns upon the idea of burning up so much humus, thereby losing nitrogen, but in making a garden on a clay soil this burning of the clods provides an invaluable source of coarse material to incorporate with the soil. The turves must be opened to the air and moved about until they dry out sufficiently to keep smouldering when a smudge fire has been made up with them. The fire is kept going and constantly fed with fresh turves but never allowed to blaze up, the object being to char the soil rather than to burn it into brick. The material is then spread and worked into the soil as cultivation proceeds.

With more normal soils which do not require this mixing with coarser material the stack of turves may be allowed to rot down into the " loam " required in the potting shed or for return to the land. The rotting process may be much accelerated by treating the turf as material for composting. As soon as the weather gets warm the stack

is rebuilt; each layer of turves receives a light dusting of a mixture of sulphate of ammonia (1), superphosphate (1) and ground chalk (2), with occasional waterings as the stack is built up. Any waste vegetable matter can be included in the mass. The heap should be kept pretty open to allow of aeration; the mass will heat up somewhat and the coarse fibre will break down rapidly. If the weather is warm action will be over in a month or six weeks and the stack can be broken down and spread, the material being as rich as well-rotted farmyard manure.

One of the most difficult cases to deal with is the light sandy land where the grass is not so much a sward as a collection of tufts or clods of stoloniferous grasses like Agrostis, which are not only in themselves difficult to break up and kill by drying, but which also leave fragments of roots or rather of underground stems in the soil, ready to start into growth as soon as conditions are favourable. Though sometimes called couch or twitch these tufts are not composed of the grass properly so called, but usually consist of one of the bent or water grasses. The best way of handling such material appears to be to dig and knock the clods about whenever they are dry enough to shed their adhering soil, then in the spring to gather them together at the side, there to be made into a compost heap each layer of which is well dusted over with cyanamide as the heap is built. The bared soil is also heavily treated with cyanamide to kill the bits of rooting stolons and the weed seeds that are always so plentiful in light soils.

So much for the mechanical side of breaking up grassland for a garden; the chemical treatment is comparatively simple. To begin with, one should ascertain if the soil is acid, either by the cheap testing outfit, which is a very simple affair, or by looking for indicator plants. The presence of Spurrey or Corn Marigold in the cultivated land, or much Sheep's Sorrel in the pasture, or Foxgloves in the hedgerows, are sure indicators of acidity. The first digging of a new garden is eminently the time to repair acidity and lay up a reserve of lime in the soil, because it is then that deep digging enables one to get in materials at depth. Ground chalk or limestone, or any form of finely divided carbonate of lime, in quantities of from $\frac{1}{2}$ to 2 cwt. per rod, should be worked in, accompanied by $\frac{1}{2}$ cwt. of basic slag or ground rock phosphate. Of course the requirements of crops for phosphates can be met by much smaller quantities of superphosphate applied annually; none the less it is worth while to build up the capital value of the soil from the outset, for phosphates are cheap and do not wash away and the gardener is not dealing with large acreages. There are experiments which seem to show that phosphate manuring has little effect upon fruit and certain vegetable crops; the results might have been different had the application been made at an earlier stage in the plants' development, most of all in its earliest seedling condition.

These recommendations may seem to have been rather liberal of fertilizers, but the expenditure on them is small compared with the costs of breaking a garden out of turf. In most cases it is very necessary, for otherwise the growth for years will remain mean and poverty-stricken.

SOME TIBETAN ROSA SPECIES COLLECTED BY
CAPT. KINGDON WARD, 1924.

By B. O. MULLIGAN, N.D.H.

IN the course of his 1924 expedition in south-eastern Tibet, as a result of which a number of most interesting and valuable garden plants were successfully introduced to this country, Capt. KINGDON WARD collected specimens of four Roses :—nos. 5631, 5834, 6101 and 6309. These were enumerated and identified by Messrs. MARQUAND and AIRY-SHAW, of the Herbarium, Royal Botanic Gardens, Kew, in *Journ. Linn. Soc., Bot.*, XLVIII, pp. 175–6 (April 1929), as follows :

- 5631. *R. sericea* Lindl.
- 5834. *R. Moyesii* Hemsl. & Wils.
- 6101. *R. Sveginzowii* Koehne var. *inermis* Marquand & Shaw,
var. nov.
- 6309. *R. sp.* (Indeterminate without flowers).

I have seen plants of all of these numbers except 5631 growing in gardens in the south of England, but have no knowledge whether that particular species was introduced or not. Major F. C. STERN kindly sent me flowering material of 6309 at the end of June 1939 from his garden at "Highdown," Goring-by-Sea, Sussex, from which it is evident that this represents LINDLEY's *Rosa Brunonii*, or a form of it with the leaves less glandular beneath than originally described. The type was first found in Nepal by Dr. WALLICH, and was subsequently collected by A. E. PRATT and Dr. E. H. WILSON in W. Szechwan, China, so that this Tibetan station is an intermediate one. The plant is a most vigorous climber, and is best placed against a tree into which it can scramble as it wills.

Of 5834 I have been able, through the kindness of the authorities at the Royal Botanic Gardens, Kew, to examine a dried flowering specimen. The protruding styles, as long as the stamens or nearly so, as well as the other characters, show it to be an example of *R. Davidii* Crép. var. *elongata* Rehd. & Wils., and not of *R. Moyesii* Hemsl. & Wils. as was at first thought. As *R. Davidii* was first discovered by Père DAVID in eastern Tibet this is neither strange nor unexpected, whereas *R. Moyesii* occurs in north-western Szechwan and Kansu, in China, and has not to my knowledge been found in Tibet. A plant bearing this number, but of an origin unknown to me, although probably raised from WARD's seeds of that year, has been growing at Wisley for a number of years, but now proves to be clearly distinct from the Kew specimen in many respects. It is much more closely related to *R.*

Sweginzowii Koehne than to *R. Davidii* Crép., but differs from the former in the glands beneath the leaflets as well as in other characters. Its identity has not been so far determined.

No. 6101 is an attractive Rose from the garden point of view bearing white, red-centred flowers in June at the ends of short shoots, followed in early autumn by smooth scarlet fruits; it is equally interesting botanically since the number of white-flowered species in the group Cinnamomeae, to which it belongs, is few and they are well marked. Those apparently resembling this plant of KINGDON WARD's are *R. Murielae* Rehd. & Wils., which has from 9-15 narrower, simply serrated leaflets not glandular beneath, and clusters of 3-7 flowers on very slender (filiform) pedicels. It can in consequence be dismissed from comparison with our plant, which possesses not more than nine doubly serrated leaflets, glandular on the lower side, and three or fewer flowers on stoutish stalks. *R. Fedtschenkoana* Reg. and *R. Albertii* Reg. are natives of Turkestan and therefore unlikely to occur at the eastern end of Tibet (although *R. Ecae* Aitch. does extend its range to N. China from Turkestan), but in addition the bristly shoots and glaucous leaves of the former and deciduous calyx of the latter render them ineligible. The little-known *R. Biondii* Crép., from northern China, may possess white flowers (it is not in cultivation), but the simply toothed glabrous leaves and a one- or rarely two-flowered inflorescence remove it from the bounds of possibility. Nor does 6101 seem to be a white-flowered variety of any species already known in gardens—there is for instance a white form of *R. caudata* Baker—while the characters stated below are sufficient to clearly distinguish it from *R. Sweginzowii* Koehne, with which it has, until now, been associated. I am therefore naming and describing it as a new species of the genus from south-eastern Tibet, and at the suggestion of Mr. COURTNEY PAGE, Secretary of the National Rose Society, to whom I am greatly indebted for much practical assistance in my study of the species Rosa growing in that Society's grounds at Hayward's Heath, Sussex, it is to be named *R. Wardii* after its energetic discoverer, Capt. F. KINGDON WARD, F.R.G.S.

This shrub has been maintained and propagated at Hayward's Heath, and it is to the National Rose Society that Wisley is indebted for plants; I have not heard of it in cultivation from any other source. Unfortunately it has not a good constitution, suffering in both places—in very different types of soils—from a peculiar form of die-back and losing some of the older branches each year. Why this should be so is not clear, since from its habitat and altitude one would have expected it to be fully hardy at least in southern England.

As there are certain distinctions between the cultivated plant and the herbarium specimens which make it advisable to distinguish between them, I have described the former as a variety of the type. While these differences may be of genetical origin, it is not impossible that physical influences may in part account for them, but until further material is available from Tibet, or elsewhere, to form a clearer

picture of the plant's characteristics, it seems wisest to take the course I have suggested.

The only previous descriptions of the species which I have been able to trace are, firstly, in the collector's Field Notes, where he states :

" K.W. 6101. Rosa. Pasum Tso. 11,000 ft. 17/8/24. In fruit—fruits flask-shaped, smooth. Bush of 6 ft. in hedges and open thickets. 23/8/24. In flower—flowers white. (Grows also below the Nyima La and the Doshong La.) "

Secondly, KINGDON WARD's remarks in "The Riddle of the Tsangpo Gorges" (1926), p. 85. "Two Roses were abundant all over Kongbo. One was a large bush with deep rose-coloured flowers and bristly flask-shaped fruits like *R. Moyesii* (K.W. 5834). The other, with scented white flowers and smooth fruits, was less common (K.W. 6101)."

Thirdly, there is the Latin diagnosis of *R. Sweginzowii* var. *inermis* Marquand & Shaw in the journal already cited, which may be translated as : "A new variety distinct from the type in the very small and few thorns on the stem and petioles, entirely absent on the receptacles and pedicels."

Rosa Wardii Mulligan, sp. nova.

R. Sweginzowii Koehne var. *inermis* Marquand & Shaw, in Journ. Linn. Soc., Bot., XLVIII, 175 (April 1929).

Species nova tibetica ad 2 m. alta e collectore, foliolis 7-9 ovatis duplicato-serratis subtus glandulosis, pedicellis glabrescentibus 2·5-3·5 cm. longis, sepalis in acumina foliacea contractis 1·8-2 cm. (in fructu ad 3 cm.) longis, floribus albis, discis kermesinis, fructibus coccineis glabris circiter 1·5 cm. longis.

Species cum *R. Sweginzowii* Koehne et cum *R. Murielae* Rehd. & Wils. comparanda, sed ab illa ramulis hornotinis purpureis, stipulis subtus glandulosis, pedicellis glabrescentibus, sepalis integris eglandulosis, floribus albis, et receptaculis levibus, ab hac foliolis paucioribus ovatis (non ellipticis nec elliptico-oblongis) duplicato-serratis, petalis duplo longioribus, ab ambabus foliolis subtus glandulosis distinguenda.

A bush of six feet in height ; *stems* smooth, reddish or purple (on the flowering specimen) ; *thorns* very few, straight or slightly curved, pale brown, 2-3 mm. long ; *leaflets* (5-) 7-9, ovate to elliptic, (1·1-) 1·3-1·8 (-2·5) cm. long by 1·0-1·5 (-1·8) cm. wide, acute or acutish, rounded to broad cuneate at the base, margin finely and doubly glandular-serrate with from 6-9, usually about 8 teeth per cm., upper surface smooth or with a few scattered hairs along the midrib, lower glandular, glaucous, the midrib appressed-pubescent lateral veins sparsely pubescent or glabrous ; *rachis* either glabrous or finely pubescent, sparingly glandular with or without a few slender and pale acicles on the underside ; *stipules* gland-edged and glandular on the back, 1·0-1·3 cm. long, the free tips lanceolate, divergent, about 4 mm. long. *Flowers* up to three in an umbellate corymb, fragrant according

to the collector, *bracts* 2, ovate-lanceolate, 1·5-1·8 cm. long by 0·6-0·8 cm. wide, finely pubescent along the inner face of the midrib, gland-edged, purplish tinged, deciduous in fruiting stage; *bracteoles* lanceolate, deciduous, gland-edged, about 1 cm. long; *pedicels* sparingly pubescent becoming glabrous in fruit, purplish, 2·5-3·5 cm. long; *receptacle* ovoid-oblong, glabrous, purplish, 6-7 mm. long by 4-5 mm. wide; *sepals* ovate-lanceolate, entire, 1·8-2 cm. long, villous within and along the outer margin, rarely very sparingly glandular on the back, tips foliaceous; *petals* broadly suborbicular, slightly emarginate, white, about 2·3-2·5 cm. wide and 2 cm. long; *styles* densely silky-hairy, protruding about 2 mm. from the red or purple disc; *fruit* oblong, smooth, about 1·5 cm. long by 0·7-1 cm. wide, with a short and narrow neck below the persistent calyx, the sepals more or less upright, tips usually persistent 1·5-2·3 cm. long.

Type. In Herb. Kew. Kingdon Ward 6101. South-eastern Tibet. Aug. 1924.

Altitude 10,000-11,000 feet. "Widely distributed on both sides of the Tsangpo."

The following details of the garden variety are taken from the plant growing at Wisley.

var. culta.

A typo ramulis olivaceis, pedicellis ad 2·2 cm. longis saepe glandulosis, sepalis ad 1·2 cm. (in fructu ad 1·5 cm.) longis, petalis 1·6 cm. latis 1·3 cm. longis differt. In hortis anglicis culta.

The variety therefore possesses olive-coloured instead of purplish stems, shorter often glandular pedicels, shorter sepals and smaller flowers. These measure 3 cm. (1½ inches) wide when expanded, are faintly fragrant and have a conspicuous crimson disc and stigmas, which are well shown in the accompanying photograph (fig. 16).

My thanks are also due to the Director of the Royal Botanic Gardens, Kew, for the loan of the type material of this and the other species enumerated; to Dr. T. A. SPRAGUE, F.L.S., for very kindly reading and correcting the Latin description and diagnosis; and finally to Mr. COURTNEY PAGE for casting a critical eye upon the completed manuscript.

THE AWARD OF GARDEN MERIT.—LII.*

255. SOLANUM CRISPUM.

Award of Garden Merit, July 17, 1939.

In the early part of the nineteenth century *Solanum crispum* was introduced to cultivation from the island of Chiloe; it is also found in several localities in Chile, where it grows on waste ground.

From the first it appears to have exercised its charm over gardeners, and, in 1832, it was figured and described in the Botanical Register at t. 1516. In 1841 it formed the subject of t. 3795 of the Botanical Magazine, and in the accompanying description we read of a plant fourteen feet in height against a south wall in an Argyllshire garden. The opinion was expressed at its introduction that *Solanum crispum* would be hardy in the British Isles and in most districts this has proved to be the case, although it is in the southern and western parts of England that it is seen at its best. Planted against a south or west wall it may generally be relied upon to succeed and, when happy, it must be numbered among the most beautiful of wall shrubs. Grown in this way it will often attain a height of twenty-five feet or even more, and as a wall plant for town gardens it has acquitted itself well. A specimen nearly thirty feet in height flowers happily every year within a mile of Hyde Park Corner.

It is not fastidious in its requirements of the soil and needs little pruning beyond the removal of dead or unwanted shoots, which should be done in spring before flowering commences. The flowers are borne with great freedom in corymbs at the end of short branches (see fig. 15). Individually they are about one inch in diameter, pale purple in colour and enhanced by a reddish streak down the middle of each segment. Their effect is further brightened by the bright yellow anthers. It commends itself particularly to all gardeners by reason of its long flowering period, which extends from early June until August.

In favoured districts it succeeds in the open border and when hard pruned each year it forms a loose but elegant shrub.

A variety known as the "Glasnevin" form differs from the type in its more slender habit of growth and its longer period of flowering, but it is considered to be slightly less hardy.

256. PRIMULA FLORINDAE.

Award of Garden Merit, July 18, 1938.

Captain F. Kingdon Ward, who discovered *Primula Florindae* in 1924, prophesied that it would prove a very desirable garden plant.

* Notes on plants which have received the Award of Garden Merit have been gathered together and published with the title *Some Good Garden Plants*. This can be obtained on application to the Secretary, R.H. Society, price 4s. Additional notes appeared in the JOURNAL R.H.S., vol. 63, pp. 190, 246, 448 and 546; 64, pp. 134, 232, 290, 374 and 484.

So impressed was he by this giant among Primulas that he named it in honour of his wife. Garden experience since that time has amply justified his optimism, and *P. Florindae* has established a reputation for amenability to the conditions that prevail in the majority of British gardens.

Captain Kingdon Ward states that it is found in southern Tibet at an altitude of about 12,000 feet ; it occurs sometimes gregariously and sometimes more sparsely over a district about a hundred miles in length from east to west and sixty miles from north to south in the middle of the Tsangpo valley between Lhasa and Tzela Dzong in the provinces of Kongbo and Takpo. It frequents the muddy margins of sluggish streams and sometimes even chooses the stream bed itself.

When happily situated in the wild, plants attain a height of four feet or even more and, although in cultivation it is seldom that plants are seen rivalling those in its native Tibet, it is remarkable that *P. Florindae* will give a good account of itself even in conditions very different from those described above. In town gardens, for example, *P. Florindae* will support atmospheric and soil conditions in which most Primulas would refuse to grow, and when any attempt is made to provide congenial conditions, *P. Florindae* repays the gardener generously for his pains (fig. 14).

The plant is distinguished from the other members of the "Sikkimensis" group of Primulas by its large petiolate leaf. The flowers are borne in a large number—often thirty or forty blossoms may terminate the three feet long flowering stem—and the whole of the inflorescence is very mealy. Individually the flowers are of good size, bright sulphur-yellow and endowed with a delicious scent. It was awarded a First Class Certificate in 1926 when shown by Messrs. Oliver and Hunter.

GARDEN NOTES.

Delphinium Wellbyi.—Mr. H. G. HAWKER, Strode, Ermington, S. Devon, writes : "I have read with interest the notes on *Delphinium Wellbyi* in R.H.S. JOURNAL for November (Vol. 64, p. 534). This plant was brought home by Capt. D. BRODIE, M.C., from Abyssinia, where he had been in a bank for twenty years previous to 1914. He was under the impression then that it was a new plant, but found out in the Herbarium at Kew that it had been introduced by Capt. WELLSBY forty years previously.

"It is not an easy plant to grow and I have seen it at its best at Brodie Castle (The Brodie's) and also at his brother's, Druim, Nairn, where Capt. BRODIE lives. With me it does well in some places and I have been able to give plants and seeds to Kew, Wisley and Edinburgh. I find it advisable to do away with the bad coloured 'washy' blue ones."

BOOK REVIEWS.

"Earth's Green Mantle : Plant Science for the General Reader." By Sydney Mangham, M.A. 8vo. 322 pp. Ill. (The English Universities Press, Ltd., London, 1939.) 10s. 6d.

Professor Mangham's comprehensive account of Earth's Green Mantle is much more than an introduction to plant science for the general reader: it is an absorbing story of the gradual development of the earth's covering from the simple and scanty materials of former ages to the rich and varied flora we know to-day. The author describes the living plant as a machine capable of building, running, repairing and reproducing itself, and every phase of its activity is explained in great detail. The history of man's interest in, and ever-growing knowledge of plants includes notes on the labours and discoveries of many celebrated botanists and chemists, both past and present.

This is a delightful book, recommended to every student of plants and to everyone else to whom the fact of mankind's complete dependence upon the continued existence of Earth's Green Mantle means everything.

N. K. GOULD.

"The Third and Fourth Generations." By Montagu C. Allwood. 2 vols. vi + 440 pp. (Allwood, Wivelsfield Green, 1939.) 7s. 6d.

This book has been written by one of three brothers who, during the past thirty years, have built up from scratch a notable business which has not only brought prosperity to its founders but redounds to the credit of English horticulture. There are no inconsiderable number of like examples, and a record of the way they have gone to work would be a contribution to the history of human affairs in a critical period. One gathers from the preface that Mr. Allwood eventually called in the help of a professional writer for his book, and one cannot but feel that this must have tamed and watered down the vigour of Mr. Allwood's own words. But one of them must have had a remarkable commonplace book, for the quotations which stud every page range from C. H. Spurgeon to the Lama-Kazi-Dawa-Samdup.

This book is meant to be read in small doses, for it consists of a series of detached reflections on the building up of character and the conduct of business. There is little about horticulture, or even about the Carnation itself, but a good deal about salesmanship, and it is not without significance that consecutive sections are headed "Wives and Business" and "Sales the Vital Test." In one or two places Mr. Allwood explains how little use he has for science and scientific men, who constitute "a mild sort of racket" for extracting salaries from the public. In another place Mr. Allwood ventures on a little science himself: "The plant I select to act as 'male' must have certain colour tendencies, for the male predominates where colour is concerned. To the 'female' I look for habit of growth, constitution, flower form, and, most important, the ability to bear seed." This has been the maxim of practical plant breeders ever since deliberate cross-fertilization began, and yet in all probability they have never tested it by making any particular cross both ways. Scientific men, who have been accustomed to make reciprocal crosses in large numbers, have never detected any special association of the male with colour or the female with form; results are the same whichever way the cross is made, except in a few cases of the whole-sale inheritance of a maternal character and in the still rarer cases of a similar carry-over from the father. But here the practical man shows his economy; his opinion does not matter—he gets the characters he wants from either parent into his seedlings whichever way he makes his cross—and if his notion that one way only had affected the results he would have tracked down his error.

But these are trifles in a book that is concerned with the doings of one man among other men; from it there does emerge a picture of Mr. Allwood, impetuous and determined, pleased with himself, trained in a hard school, a bonny fighter, but a man who has kept his mind open to many interests and has wholeheartedly enjoyed his life.

JOURNAL OF THE ROYAL HORTICULTURAL SOCIETY

Vol. LXV



Part 3

March 1940

LIBRARY

THE SECRETARY'S PAGE.

It is hoped that all our climatic troubles of winter will be over by the time this JOURNAL appears and that the first two Shows of the year will have been successful. As a result of this winter, there will, undoubtedly, be many sad losses in the gardens, and everyone will wish their displays to be kept up and the blank places filled ; so a visit to the Society's shows will give an opportunity of seeing plants worthy to take the place of those lost. It would, however, be of great interest if Fellows, who have lost rare or some of the doubtfully hardy plants, would send a list of their casualties, for it is only from experience that the hardiness of plants can be judged.

The report of the Annual Meeting of the Society will be published in the April number.

There will be a Fortnightly Show on March 19 (12 noon to 6 P.M.) and 20 (10 A.M. to 5 P.M.). Alpines will be a special feature in conjunction with the Alpine Garden Society. In the afternoon of March 19 (not March 20 as given in the February number) Captain Kingdon Ward will lecture at 3 o'clock on his recent plant hunting in Assam in the Eastern Himalaya.

In the afternoon, at 3 o'clock, on March 20 Mrs. V. Higgins will give a talk on "Some Plants in the Show."

There will be a Fortnightly Show on April 2 (12 noon to 6 P.M.) and 3 (10 A.M. to 5 P.M.), at which Perpetual-flowering Carnations will be a special feature, in co-operation with the British Carnation Society, and in the afternoon at 3 P.M. in the Lecture Room the first of the Masters Memorial Lectures of the year will be given by Professor F. E. Weiss on "Graft Hybrids and Chimaeras."

On the afternoon of April 3 there will be a lecture arranged by the Institute of Landscape Architects.

The Daffodil Show, in conjunction with the Fortnightly Show, will be held on April 16 and 17. Schedules are still available for those who desire to compete in the classes. Entries close on Saturday, April 13. The Shows will be open from 12 noon to 6 P.M. on the first day, and from 10 A.M. to 5 P.M. on the second day.

In the afternoon of the first day the second of the Masters Memorial Lectures will be given by Professor Weiss on "Graft Hybrids and Chimaeras," and on the second day Major C. B. Habershon, should his duties permit, will give a short talk on "Some Plants in the Show."

It is hoped that all Fellows interested in Daffodils will make an effort to make this Show worthy of the occasion and that there should be no hesitation in sending flowers for exhibition purposes.

A Fortnightly Show will be held on April 30 (12 noon to 6 P.M.) and May 1 (10 A.M. to 5 P.M.) at which Rhododendrons, Auriculas and Primulas will be features, in co-operation with the Rhododendron Association and the National Auricula and Primula Society. Besides this there will be competitive classes for amateurs for flowering trees and shrubs and Rhododendrons. Full particulars of these competitions can be obtained on application to the Secretary.

On April 30, at 3 P.M., Mr. A. J. Cobb will lecture on "Sowing and Planting the Vegetable Garden in Summer and Autumn," and on May 1, at 3 P.M., Mr. J. Comber will give a talk on "Some Plants in the Show."

THE LILY GROUP.

In the evening of April 30 the first of the Lily Group meetings will be held in the Restaurant of the Old Hall at 4 P.M., when a discussion on "Plants to Associate with Lilies" will take place. Notices to all registered members of the Lily Group have been sent out, but particulars can always be obtained on application. Fellows who are not members of the Group are invited to attend.

PRACTICAL DEMONSTRATIONS AT WISLEY.

Practical demonstrations at Wisley will take place on

March 6 and 7, 2 to 4 P.M.—Seed Sowing—Indoors and Outdoors.

March 14 and 15, 2 to 4 P.M.—Rose Pruning and Pruning of Shrubs.

April 3 and 4, 2 to 4 P.M.—Spring Spraying of Fruit Trees.

April 17 and 18, 2 to 4 P.M.—Control of Vegetable Pests and Diseases.

Those persons who desire to attend the demonstrations should notify the Director of the Gardens beforehand.

EXAMINATIONS.

The Teachers' Preliminary and Advanced Examinations will be held throughout the country on Saturday, March 16.

The written examination of the British Floral Art Diploma will be

held in London in the Society's premises on March 14. The practical portion of this examination will also be held in London on April 25 and 26.

The written examination for the National Diploma of Horticulture will take place on April 27.

APPLICATIONS FOR SURPLUS PLANTS AND SEEDS.

The time for receiving the application forms for surplus plants and seeds is closing on March 9, in accordance with the warning set out in the February JOURNAL.

SUBSCRIPTIONS.

There are still a number of subscriptions outstanding, but it is hoped that the arrears will be quickly forthcoming.

THE LINDLEY LIBRARY.

The Secretary would like to emphasize that the Library service is being maintained. The Assistant Librarian will be on full time duties on the days of the Fortnightly Shows from February 20 onwards, and is in the Library on other days from 2.15 P.M. If Fellows who desire to visit the Library in the morning to see particular books would kindly send a line beforehand it would be possible for the Assistant Librarian to look out the books and have them in readiness so that the enquirer may make use of the Library in the morning.

PANEL OF LECTURERS.

The panel of lecturers is growing, but more lecturers are still required.

THE SMALL EXHIBITS TABLE.

One of the many attractions at the Fortnightly Shows is the table for small exhibits from Fellows. In these days, perhaps, with a little encouragement, more use might be made of this table. Most Fellows have from time to time some plant or flower, fruit or vegetable which may be either uncommon or well grown that would be of interest to other Fellows, and the small exhibits table on the dais is specially provided for the purpose. There is no need to apply in advance for space. The exhibits may be brought by Fellows or sent by post, provided they reach the Hall before 12 noon on the first day. A clerk in attendance will see to their staging and labelling. The exhibits staged under this arrangement should not consist of more than three pots, vases or dishes. The Society, however, cannot be responsible for their return.

BINDING THE JOURNAL.

To fulfil the binders' requirements for the JOURNAL in its present form, advertisements will be printed both before and after the text and "Extracts from the Proceedings" (numbered in Roman figures) when published will be placed in the middle of each part.

WISLEY IN MARCH

WITH the advent of spring plants awake again and more flowers are to be seen each week in all parts of the Gardens. This is especially noticeable in the rock garden and in the Alpine house, where many species are gathered together which in their natural haunts flower early in the year after the snow has disappeared.

Visiting first the Alpine house, we find the Moroccan *Ranunculus calandrinooides* still displaying white or pink-tinted Buttercups, although it may have been some weeks since the first appeared. Species of *Narcissus* (*N. nanus*, and the charming white-flowered *N. Watieri* from the Atlas Mts.), of *Primula* (*P. Allionii*, the pink *P. Dubernardiana*, and *P. marginata* with toothed, mealy leaves and lavender flowers in clustered heads), the tight cushions of the golden *Draba polytricha*, yellow bells of *Fritillaria citrina* and *F. pudica*, with species of *Cyclamen* such as *C. vernum* and *C. coum*, are some of the typical plants which visitors may expect to find here. But the greatest show will be made by the large collection of Kabschia or encrusted Saxifrages, both species and hybrids, in many shades from white and yellow to pink and rose, with the curling red croziers of *Saxifraga Grisebachii*. These Saxifrages begin their flowering season in February and will not close it until May is reached.

In the beds or frames adjoining the house are more species of *Fritillaria*—some grown from collected bulbs—*Hyacinthus orientalis* with pale china-blue bells on slender stems, the earlier *Tulipa* species—*T. Kaufmanniana* and *T. praestans*—the former in creamy-white, yellow or scarlet, the latter vermillion-red, and the many sorts of spring-blooming Crocuses, including the golden *C. Korolkowii*, buff or striped *C. chrysanthus*, and the delightful blue *C. Pestalozzae* var. *caeruleus*.

Another unusual bulbous plant growing near the top of the rock garden is the hybrid *Chionosella Backhousei*, whose name betrays its origin; it produces rich blue flowers in great quantity, and makes an excellent spring picture growing near *Daphne Blagayana*. In March the multitudes of Hoop-Petticoat Daffodils cover the grassy bank below the rock garden with their golden or sulphur-yellow flowers—one of the prettiest sights of the whole year at Wisley, and one which is annually increasing in area as the bulbs spread by seeding across the meadow. Other bulbous plants deserving mention are the broad-leaved Snowdrop, *Galanthus latifolius*, the Dog's Tooth Violets, *Erythronium Dens-Canis*, the last of the Winter Aconites, *Eranthis Tubergeniana*, with rich golden, globular flowers surrounded by their green collars, and the tall *Leucojum vernum* var. *Vagneri* in the bog garden. Two species of Rhododendron which, if the weather allows, will flower now are the pure white *R. leucaspis* on a rocky shelf by the top path of the rock garden, and the hybrid *R. cilpinense* with pink-

tinged bells large for the size of the plant. Patches of bright blue in various places indicate the presence of that early Lungwort, *Pulmonaria angustifolia*, most useful for any shady place, of which several forms are growing on the rock garden, whilst some of the hardier Saxifrages such as *S. oppositifolia*, *S. apiculata*, and the yellow hybrid 'Mrs. Leng' can also be found on the scree and elsewhere.

The most noticeable feature in the Wild Garden this month is *Narcissus cyclamineus*, whose flowers of richest yellow can be seen in damp and shady spots near the ditch on the south side adjoining the rock garden. Of the shrubs, *Rhododendron lutescens* and *R. × praecox* are two of the forerunners of their family, in yellow and rose-purple respectively; they are accompanied by the three *Pieris* species, *floribunda*, *japonica*, and *taiwanensis*, with white tassels and evergreen foliage. In the clearing in the centre of the Wild Garden will be found the first of the shrubby *Corylopsis*, *C. pauciflora*, with catkin-like yellow blossoms appearing before the leaves, and another interesting member of the same family (*Hamamelidaceae*) is the evergreen *Sycoptis sinensis*. The sweet-scented *Daphne hybrida* (*Dauphini*) will still be producing clusters of rose-pink flowers at the tips of the shoots, one of which forms an excellent and fragrant buttonhole. .

The Heathers in Seven Acres make a gay display for some weeks at this period of the year. Foremost among them are the numerous varieties of the Swiss *Erica carnea*—'Springwood White,' *Vivellii*, and the glowing purple 'King George' being some of the most conspicuous for colour or quantity of bloom. Somewhat taller and bushier is the hybrid *E. darleyensis*, of a paler lilac-pink tone, perhaps the best Heather if only one is to be planted in a small garden. Taller still are the several forms of the Mediterranean Heath—*alba*, *hibernica*, 'Brightness,' and the fine *superba* which will attain 5 feet and makes an admirable and flowery shrub for March. Finally the Tree Heath, *E. lusitanica*, from Portugal, must not be omitted, nor its offspring *E. Veitchii*; both of these have white flowers, and like all the others mentioned are particularly acceptable to bees at this early period of their activities.

In the shrub collections in this part of the Gardens the Forsythias will be outstanding, both for their bright colour and profusion of flowers; *F. Giraldiana* is the earliest, to be followed by the dwarfer and more compact *F. ovata*, *F. suspensa*, and the hybrid *F. intermedia*. The earliest of the *Prunus* trees, in addition to *P. Conradiæ* var. *semiplena*, which is the first to flower in February, is *P. cerasifera* var. *Pissartii* and its several forms, of which *nigra* is perhaps the deepest in pink hue, and also the darkest purple when the leaves mature. Near the pond are some forms of the Japanese and Chinese Quinces, varieties of *Chaenomeles* (*Cydonia*), many of which have been raised on the Continent and produce a great selection of colour in March and April, from white through rose and salmon to scarlet. The tree-like Japanese *Magnolia Kobus* may well come into flower before the end of the month, the white blooms conspicuous on the naked branches.

Whilst dealing with the shrubs it is as well to state that there is likely to have been considerable damage as a result of the severe frosts experienced in December and January, but, although this is evident at the time of writing these notes, it is not possible to say which are completely killed and which likely to recover. Some of the evergreens such as Berberis, Pyracanthas, Cotoneasters, Escallonias and Ceanothus look especially harmed in foliage, but may revive later with the coming of milder weather. The drying effect of such long-continued frost is the greatest danger with which plants have to contend, and on the light Wisley soil penetration is deeper than in heavier mediums.

In the Award of Merit garden *Daphne Mezereum* is at its best—a rich pink form with large flowers scenting the air around; and in the same quarter grows the Cornelian Cherry (*Cornus Mas*), like a rather spidery *Hamamelis* in its yellow blossoms. *Scilla* and *Chionodoxa* bulbs are planted here beneath the shrubs of *Forsythia* and *Prunus incisa*, to give added effect to their flowers at this season.

The glasshouses, particularly the large Temperate house, have many plants of more than passing interest to show. Here are species of *Acacia* with clusters or balls of yellow flowers, *Begonia fuchsoides* producing pink flowers over a long period, varieties of *Camellia japonica* and the double pink *C. maliflora*, the tubular pink blooms of *Correa speciosa*, South African Heaths, the soft yellow and buff of *Loropetalum chinense* and *Pomaderris elliptica* happily situated beside one another, and the large white or pink-tipped trumpets of some of the tender Rhododendrons like *R. ciliicalyx* and 'Countess of Haddington,' with the pale yellow, smaller *R. burmanicum*.

Primula malacoides, in the most modern varieties which have been sent for trial, will continue to bloom throughout this month in the second house, accompanied by Cinerarias.

One of the most striking plants in the Half-hardy house is the prostrate form of the Tasmanian *Acacia diffusa*, which is annually almost hidden by the profusion of flowers which it bears. In the earlier part of the month *Paeonia Cambessedesii* from the Balearic Islands is in bloom, with rosy-pink cups and foliage purple beneath but silvered on the upper side. Here also are the Italian *Primula Palinuri*, resembling a gigantic yellow-flowered Auricula with mealy, powdered heads, the yellow inflorescences of the South African bulb *Cyrtanthus lutescens*, and several half-hardy shrubs which are happily placed here—*Candollea cuneiformis*, *Cassia stipulacea*, and the Australian Mint-bush, *Prostanthera rotundifolia*, with scented leaves and a wealth of small mauve flowers.

THE KITCHEN GARDEN IN MARCH.

THE weather conditions of the past few weeks have not been highly favourable for the preparation of the ground, and no effort should now be spared in making up the lost time.

The month of March is the sowing and planting time for most of the important vegetable crops. Sowings of Peas, round-seeded Spinach, stump-rooted Carrots, Turnips and Broad Beans, should be made to provide successional batches which will follow those from earlier sowings. If the main Onion crop has not already been sown, it should be done on ground which has been well firmed by treading. The first sowing in the open of Lettuces should take place during March, and for this purpose a good Cabbage variety is to be preferred. Early in April is quite soon enough to sow the Cos varieties. Parsnips and Brussels Sprouts should also be sown during March, and enough seed of a good variety of Leek should be sown to provide a large batch of plants.

In the small garden especially the value of Leeks is not always appreciated to its fullest extent. There are few vegetables which will withstand severe weather as well as Leeks, and fewer still that will continue their season for such a length of time and provide supplies at a season when all vegetables are scarce.

The remaining plants of last year's Leeks and Celery should be lifted and laid in on a sheltered border to prevent the formation of further top growth.

Sowings of Celery may be made in a greenhouse during the month of March, and, owing to the danger of the Celery rust disease which may be transmitted with the seeds, it is of paramount importance to obtain supplies only from reliable seedsmen who take precautions to safeguard their crops.

Towards the end of the month the first plantings of early Potatos may be made, and new plantations of Rhubarb may be effected with success at this time when the plants are just commencing to make new growth.

If new Asparagus beds are to be planted in April, the ground should be thoroughly prepared by deep digging and incorporating a plentiful supply of manure, the whole work being completed before the end of March.

Careful attention should be paid to frames in which crops of vegetables are being grown. Young Carrots, for instance, should be thinned, and they will probably be requiring more water than during the winter months. Lettuce plants nearing maturity may have to be shaded if there should be strong bursts of sunshine in the middle of the day. Any young Cauliflower or Cabbage seedlings, which are ready for pricking out, may be placed in the frames during March.

If the buds of Peaches and Nectarines have not commenced to swell, spray the trees with Burgundy or Bordeaux Mixture to control Peach Leaf Curl. Protect the flowers of Apricots, Peaches and Nectarines from damage by spring frosts by screening the trees at night with tiffany, blinds, or several thicknesses of fish netting. Raise the screens during the day when weather conditions are favourable, but lower them each night until all danger of frost is past. When these fruits come into flower ensure pollination by lightly dusting the open blossoms during sunny weather with a camel hair brush. Prune newly planted Black Currants by cutting every shoot on the young bushes back to two buds just above ground level. This severe pruning is to encourage good shoots to be made during the summer, thus ensuring an established fruiting bush for next year. Newly planted Blackberries and Loganberries are pruned likewise, except that each cane is shortened to a good bud within 15 inches of the ground. Gooseberries and Red Currants which were left unpruned during the winter to minimize the damage to the buds by birds can now be pruned ; after pruning run strands of black cotton between the branches to keep the birds off. Complete the winter pruning of any other kinds of fruit trees or bushes as soon as possible. Tread around all trees and bushes which have been planted during the past winter to firm the soil which has been loosened by the frost. Examine trees which have been staked and make fresh ties where necessary. Spray Strawberries with a solution of lime sulphur (one in thirty) to act as a deterrent against Strawberry mite ; add a suitable spreader, such as Agral 1, to the wash. As the spring is now advancing the ground is beginning to become warmer and all types of soil will benefit greatly from frequent hoeing, particularly those soils bearing Strawberries, Raspberries, and other soft fruits. In the early viney maintain a night temperature of about 60° F., keep the atmosphere moist and provide a little top ventilation during bright days. As the laterals on the rods develop, gradually bring them down to the wires, and stop each lateral two leaves beyond the bunch. Early Peaches under glass should be gradually thinned as soon as the fruits have reached the size of a Hazel nut ; at the first sign of *aphis* fumigate the house.

FEATURES OF MY GARDEN.—I.

MAGNOLIAS AT BODNANT.

By The Lord ABERCONWAY, C.B.E., V.M.H.

AFTER the last war, a number of Magnolias was planted at Bodnant, most of them in beds of Rhododendrons or low-growing shrubs.

On the whole, the climate and the soil (which does not contain lime) have suited them, although, of course, in some years, frost has destroyed or damaged the early flowers.

Perhaps the best doer of the Magnolias has been *M. Kobus*, which succeeds in any situation. The original form of this appears to flower earlier and more freely than the variety *borealis*, although the latter makes a very much better shaped tree. While the individual flower of this species is thin and straggly and has not the lovely cup-shape of the flowers on plants of what we may call the *conspicua* section, yet large trees of *M. Kobus* have such an unbelievable abundance of blossom that the effect is very fine indeed. A tree planted at Bodnant twenty-three years ago, and now 30 feet high and 35 feet across, is estimated to have this spring something of the order of 20,000 flower-buds. *M. salicifolia* is very good in that it expands its very white flowers before even a touch of green appears on the leaf-buds. *M. salicifolia* is, however, not such a good doer at Bodnant as *M. Kobus*, which is a pity, as in its spreading form it is a more graceful and shapely tree, and flowers earlier in life.

There are, of course, two forms of this species. The erect form is not so ornamental as is the spreading one, as its bunched-up habit is not graceful, and the flowers are apt to concentrate too much on the top, but it seems to be the more vigorous of the two. Even so, planted at the same time and adjacent to the *M. Kobus* just referred to, it occupies perhaps one-fifth the cubic space that its neighbour does, and bears perhaps one-twentieth of the number of flowers.

M. stellata is also a very free-flowering plant at Bodnant. The two largest are about 12 feet high and 15 feet through. One of them has the buds tinted with pink, and flowers a fortnight later than the common form.

There have been recent sendings from Japan of a *M. stellata* var. *rosea*, which has a flower of a deeper pink than that of the other variety, but these, as yet, are only small plants at Bodnant.

To turn to another section of the genus; plants of *M. conspicua* (*M. denudata*, as botanists like to call it) have also done well at Bodnant planted in beds in sunny situations. The trees themselves tend, unfortunately, to be somewhat shapeless in spite of certain pruning. The hybrids *Soulangiana* var. *Lennei*, var. *rustica flore rubro*, and var.

Bronzoni are equally lacking in shape. The other forms of *M. Soulangiana* are not grown at Bodnant, as they are not equal to the parent *M. conspicua*, or to the three above-named hybrids. The most vigorous of the *M. conspicua* hybrids, a cross with *M. Campbellii*, is *M. Veitchii*, which has made large trees of 30 feet in twenty-four years. It must be confessed, however, that although it flowers fairly freely, the general effect at flowering time is apt to be disappointing. Some of the flowers are usually damaged by frost before they open, and there are therefore often a number of imperfect flowers on the tree. Besides this, the leaves are apt to show with the flowers, and this always impairs the beauty of a Magnolia.

A seedling plant of *M. Sprenger* var. *diva*, generously sent to Bodnant from Caerhays a foot high in 1928, has now grown to be a tree of a beautiful symmetrical shape, upright in habit. It is growing vigorously and has attained a height of over 20 feet, but has not yet flowered, possibly because it is in a somewhat sheltered place. Of *M. Sprenger*, the white form, there are two of the original WILSON seedlings at Bodnant. One planted out twenty-three years ago has made a fine tree of 30 feet in height. Its flowers are in shape not quite of the quality of the best forms of *M. conspicua*, but they are abundantly produced and beautifully poised on the branches. The plant differs markedly from *M. conspicua* in being a real tree, growing closely upright and with no tendency to assume a bush shape. It is a very fine Magnolia.

M. Campbellii has proved a quick-growing straggly tree, apt to be brittle and very long before it flowers. One specimen planted against a high south wall in 1904, however, flowered for the first time in 1921, while another one against a more shaded wall, planted in the same year, did not flower until 1938.

The former plant, which is now 25 feet high and 20 feet through, carried one year over 100 flowers, but in certain years the number has dropped to thirty or forty, so that it cannot be called a very consistent bloomer; but as its flowers are 10 inches across, and a fine pink, they make up in quality what they lose in quantity.

Its near relation, *M. mollicomata*, is very much its superior in flower production. A plant, given by a friend, from seed Forrest No. 24214, growing on a rather shaded west wall, flowered in twelve years from seed, and now blooms regularly and abundantly. It flowers a fortnight later than *M. Campbellii*. Its flowers are flatter than those of *M. Campbellii*, and the flower-buds are markedly distinct from those of that species. It makes also a closer growing and more upright tree. Flowering as it does so much earlier in its lifetime, and so much more freely, it is a better plant than *M. Campbellii* from a gardening point of view.

Two plants of more recent introduction are of interest, *M. Dawsoniana* and *M. Sargentiana*, both of which have been freely planted at Bodnant. The first is a vigorous-growing, bushy plant which does well in most situations. It has not flowered at Bodnant, as none of

the plants were original seedlings, nor even the plants first propagated from them by CHENAULT; but Mr. GEORGE JOHNSTONE states that his first impression of it, as having not too good a flower, has been modified by subsequent experience, and that although the flowers have not the best of shapes, it is none the less effective.

M. Sargentiana is, at Bodnant, not nearly so strong a grower. Indeed, away from a wall it is a very slow and uncertain starter, and even in some cases has refused to start at all. When it once gets going, however, it makes more rapid progress, but at Bodnant, away from a wall, it is a thin, sparsely branched tree.

A plant of the form *robusta*, however, now 10 feet in height, planted out seven years ago, has flower-buds this spring for the first time, which is surprising, for much bigger plants show no sign of flower.

Magnolias of the *parviflora* section do well at Bodnant. Some old plants of *M. parviflora* itself have formed large spreading bushes 15 feet across and 10 feet high. The oldest of those plants, believed to have been acquired from VEITCH of Chelsea, all have very deep maroon stamens. In some of those acquired later from other sources the stamens are pale, and the flower somewhat smaller, while the form *semiplava* acquired from Japan produced a very poor single flower, and was promptly scrapped. Those desirous of planting this species should try, therefore, to get layers or seedlings from the best type. A very hard late spring frost has been known to kill all the flower-buds, although these buds as a rule pass unscathed.

Two other species of this section, *M. sinensis* and *M. Wilsonii*, flower freely, the latter both in the broad-leaved and the narrow-leaved forms. Comparing the three species, on the whole, the flower of *M. sinensis* is the best, but it is the most straggly, although the most vigorous, grower.

The two forms of *M. globosa* are extremely vigorous-growing plants. The Chinese form, formerly known as *M. tsarongensis*, is a very early grower, and its shoots are apt to be cut by spring frosts.

The Himalayan type grows later. These two types are very distinct in appearance, and I question whether they are not distinct botanically. Neither of them has as yet flowered at Bodnant.

Magnolia hypoleuca (now called *M. obovata* by some botanists) is a real tree, sparsely branched and now 40 feet high at Bodnant. It seems to be the least brittle of the Magnolias, perhaps because the branches are far apart and very flexible. It does not flower for many years after it has been planted, but when it does flower its blooms are finely held and very large and sweetly scented.

The same may be said of *M. Watsonii*, now also a large but curiously misshapen tree, which scents the air at flowering time thirty or forty yards away.

Of the evergreen Magnolias, *M. grandiflora* does well, although it would probably flower more freely in the south.

Two plants of the variety 'Goliath,' grown as standards in a somewhat shaded site, are now bushy little trees some 12 feet high.

They should be more often grown in this way, as apart from flowers, they make a most ornamental tree.

M. Delavayi is rather tender for an open situation, but grown against an 18 feet wall, it tops the wall by a dozen feet. Thirty-two degrees of frost this winter have slightly browned some of the leaves. Although the flowers are very evanescent, its foliage and habit make it a magnificently dignified wall plant.

Four plants of original seedlings of *M. nitida*, from Chinese seed sent from Caerhays, have proved quite hardy on a wall, and if it had been more plentiful, it would have been tried in the open, where, I have no reason to doubt, it would succeed. This winter's frost has apparently not damaged a leaf or bud even where the plant has topped the wall by 6 feet. Its leaves, shiny as though varnished, are most distinct, and its scented flower, though not yet seen at Bodnant, is quite good. The plant roots from cuttings, though not at all easily, but in time it should be generally grown, as it thoroughly deserves to be.

Those who have had some experience of Magnolias must agree that there is no race of wooded plants, save perhaps Rhododendrons, that produces a finer effect in the garden. Against the house, in the formal garden, and in the wild garden they are equally appropriate, and while magnificently sensational when in flower, they never seem out of place.

GARDEN NOTES.

THE NOMENCLATURE OF THE GENUS PHYLLODOCE.

On May 5, 1936, an Award of Merit was made to a plant shown under the name of *Phyllodoce hybrida*, the exhibitor reporting that it was a natural hybrid between "*P. empetriformis* and *P. Brewerii*" (vol. LXI, 294 and cxxiii). It has now been determined that the plant was not a hybrid but *P. empetriformis* (Smith) D. Don. The nomenclature of the genus was clarified by Dr. FRED STOKER in The New Flora and Silva, vol. XII, No. 1, November 1939. It would appear that the plant which is known in gardens as *P. empetriformis* is not that species, and although "perhaps the most beautiful and certainly the most popular" member of the genus it is a plant of unknown origin which Dr. STOKER provisionally refers to as *P. pseudoempetriformis*.

COMPOST-MAKING FOR GARDENS.

By Sir DANIEL HALL.

THE making of composts as a means of maintaining the fertility and particularly the humus content of the land has been a good deal before the public for some years, but with war upon us it has become pretty well the only way to keep up production either in market gardens or in private establishments. Of course there is nothing really new in the process : every gardener had his rubbish heap on to which went cuttings from the lawn, the hedge clippings and the leaves that were swept up, and after a sufficiently long interval the vegetable material rotted down to something that could be put back on the land. But the process was slow and many gardeners preferred to burn their rubbish, so little value did they attach to the resulting mould. Light on the subject came from some researches of Dr. H. B. HUTCHINSON at Rothamsted, who showed that the cellulose materials of straw and plant tissue generally are not readily attacked by bacteria when merely left in a wet condition. But if a little active fertilizer, mainly nitrogenous, is also present to supply necessary nutriment to the bacteria which attack the cellulose, the material "ferments," heats up and rapidly becomes reduced to brown humus. Wet straw will lie for months merely turning brown ; the same wet straw permeated by the urine of farm animals soon changes into the soft farmyard manure in which none of the structure of the straw can be seen. At Rothamsted RICHARDS followed up this investigation by working out the well-known "Adco" process of converting straw and other vegetable refuse into manure without the intervention of animals, supplying the nitrogen, etc., necessary to start the fermentation by artificial fertilizers. Many gardeners on both a large and a small scale have found this process invaluable as a means of keeping their soil in condition. Sir ALBERT HOWARD, working on the same principle, showed that town refuse would furnish not only the active nitrogen to start the composting process but itself contained large quantities of material that could thus be converted into humus, notably waste paper. He thus enlarged the scope of the process, and his technique has become of great importance in the plantation industries in tropical and semi-tropical countries where the humus of the soil is burnt up so rapidly yet is even more essential to the proper working of the soil than it is in our temperate climate.

Thus from one line of investigation and another we have learnt that composting is not only the most valuable way of utilizing all waste material of vegetable origin but that it is also a means of making more effective whatever quantities of artificial fertilizers may be available. It is unwise to turn straw or even green crops into the

land, because in order to rot down they use whatever active fertilizing material is present in the soil and for the time immobilize it. The crop following green manuring generally suffers from nitrogen starvation and the benefit from the material turned in shows only in later years. Again, the return from a fertilizer like sulphate of ammonia is poor on a soil that is scantily supplied with humus, but if the green crop and the sulphate of ammonia are first composted together, full value can be obtained from both and that without any delay—an important factor, since the gardener cannot leave his land out of action for a season. The one drawback about composting is that it involves labour, scarcer than ever in war-time, but it produces a home-made fertilizer which is necessary to the gardener and cannot be bought, since transport for bulky material like stable manure will be even more curtailed than labour upon the land.

The procedure is simple enough. Choose a level piece of land with a water supply at hand, trample it firm for the foundation, and then make a heap of all the waste vegetable matter available—grass cuttings, hedge clippings, rough grass, vegetable trimmings, dead leaves, paper, etc., to a depth of 6 or 8 inches. The more the material can be bruised and knocked about the better. Cabbage stalks, for instance, do not rot much unless they can be cut up or crushed. The mass must then be wetted : this sometimes is difficult, especially with dry, strawy material. Trampling and repeated light sprinklings will, however, ensure wetting. Then the surface is dusted over with a mixture of $\frac{1}{2}$ -1 oz. of sulphate of ammonia, $\frac{1}{2}$ oz. of superphosphate, and an ounce of ground chalk or limestone, to the square yard, all watered in by a final spraying. Then cover with a few inches of soil and if the material is available add another vegetable layer as before. The heap can thus be built up in successive sandwiches to a height of 4 feet or so. When first making the heap early in the season supplies will be short, and a week or so may elapse before the second layer can be put on. The heap will soon begin to heat : how rapidly depends on the weather ; some people like to turn it when the heat begins to subside, but this is not necessary, although it makes a more uniform product.

It is worth while collecting Bracken and hedgerow trimmings—any kind of vegetable refuse from the waste land—and the greener and fresher it is the better. Bracken, for example, in August is rich in nitrogen and especially in potash, both of which are largely returned to the roots before the plant withers. Similarly dead leaves have lost most of the fertilizing material they possessed in their green state, although even now they contain enough fermentable material to be worth composting.

After about three months the mass is ready for use ; it will be as valuable as good farmyard manure, and should be treated in the same way.

THE ROYAL BOTANIC GARDEN, EDINBURGH.

By JOHN MACQUEEN COWAN.

VISITORS to the Royal Botanic Garden, Edinburgh, will go first to the Rock Garden and Heath Garden or perhaps to the Pond with its background of dark green Yews, for this is a favourite haunt of artists when all the Primulas which fringe its banks are in flower and their gay colours are reflected by the water. During April and May when the Rhododendrons bloom, and later, when Meconopsis and the Giant Himalayan Lilies are in flower, the Woodland Garden is a much-frequented retreat where one seems far remote from the busy streets and traffic of the city. Trees and shrubs are planted closely throughout the Arboretum, so that within the garden one finds few vistas, but from the top of the hill there is a magnificent view over the spires and domes of the city to Arthur's Seat and the Pentland Hills (fig. 18). The slopes of the hill itself are richly coloured when hybrid Rhododendrons come into flower in June. Other parts of the Arboretum should be visited at times when the various groups of trees and shrubs are at their best—Cherries, Crab Apples, Buddleias, Lilacs, Barberries, Philadelphus, Hydrangeas and Viburnums in their season—or when the ground is carpeted with Crocuses or Daffodils in spring. In August, the Herbaceous Border with its grass-green central walk and tall Beech hedge behind is doubtless the most attractive part of the garden.

The Plant Houses are worthy of attention, especially the Alpine House where half-hardy alpine plants are growing freely in narrow, stone-built terraces; also the Rhododendron House where the more tender species are grown. Here there are large specimen plants such as *R. arboreum*, a tree of indefinite age but possibly raised from seed sent to the garden by WALLICH from Nepal in 1816; *R. grande*, *R. Griffithianum*, a large pink-flowered form of *R. decorum*, *R. prophanthum*, *R. Griersonianum*, which bears more than a hundred trusses of geranium-coloured flowers, *R. Dalhousiae*, *R. Nuttallii*, and *R. rhabdotum* with its curious purple-banded corolla, are all to be seen flowering in spring or early summer. *R. giganteum*, which has not as yet flowered in the garden, fills a central bed. These houses are scarcely heated, but one passes through festooned corridors to the Tropical Houses at one end of the range where economic plants, insectivorous plants such as *Nepenthes* and *Darlingtonia*, Orchids, Ferns and many other plants are grown. The Palm House, with its tall Palms, Cycads and Tree Ferns, stands by itself. The propagating department lies behind, out of sight. The garden, which is maintained by Government, extends to over sixty acres.

In its early days the Royal Botanic Garden, Edinburgh, like a good many other institutions of its kind, was known as the Physic

Garden. One of the oldest botanic gardens in the country, dating back to 1670, it began as a small garden plot in which medicinal plants might be grown so that they would be readily available for study by the apprentices in the shops of the apothecaries who practised in the city. Towards the end of the seventeenth century the sciences of medicine and botany were still in their infancy ; Scottish students were accustomed to travel to some centre in Europe to pursue their studies. One student, on his return from Leyden in Holland—**ROBERT SIBBALD**, who was afterwards knighted—resolved that other Scottish apprentices should have the opportunity of studying the plants they were called upon to use without the necessity of undertaking a difficult journey abroad ; and with the help of his friends, Dr. **ANDREW BALFOUR** and **PATRICK MURRAY** of Livingstone, who were both keenly interested in collecting and cultivating plants, Sir **ROBERT SIBBALD** got together a number of native and medicinal plants, established a garden and arranged that a young man named **JAMES SUTHERLAND** should be placed in charge. A few years later the Town Council of Edinburgh provided a larger piece of ground where **SUTHERLAND** established the Physic Garden. The site which it occupied, beside Trinity Hospital, lay at the foot of the Calton Hill and now forms part of Waverley Railway Station. **SUTHERLAND**, appointed " Intendant " in 1676, became the first Professor of Botany in the University of Edinburgh, which was then the Town's College. About 1695 he was elected also to the charge of the Royal Garden within the precincts of Holyrood House and he became King's Botanist in Scotland. Thus was inaugurated at a very early date a close connection between the Royal Garden and the University, an association which has been maintained until the present day. The Regius Keeper of the garden is at the same time King's Botanist in Scotland and Regius Professor of Botany in the University of Edinburgh.

From a number of prints and various contemporary documents which still survive, we learn that the old Physic Garden was laid out in formal beds in which not only medicinal plants were grown but also others of our native flora, and these were apparently grouped in some systematic order. The arrangement in the Physic Garden is recalled in the part of the present garden which is devoted to the Students' Collection. **SUTHERLAND** in 1683 published his *Hortus Medicus Edinburgensis*, a catalogue of the plants which were then in cultivation. The list extends to some two thousand names and nearly all can be identified ; it includes Henbane, Mandrake, Liquorice, Mulberry, Tobacco, Dog's Tooth Violet, many common British plants and a very early record of the Larch in Scotland ; also the names of many common vegetables which were beginning to be known generally in cultivation about that time. Further information may be gleaned from other sources. **SUTHERLAND** in his letters makes frequent reference to the difficulties he encountered in establishing his plants. One interesting contemporary drawing shows how attempts were made to keep plants alive under large bell jars ; these were the only protection

that the more tender species could be given, for there were no glass-houses until a later date (1712).

It would be superfluous here to write, even if space permitted, in detail of SUTHERLAND's life and work—the long and arduous journeys he made through Scotland on foot to gather plants and seed—his correspondence with Sir HANS SLOANE—the exchange of plants which were often sent by sea from Leith, carriage over land was too uncertain—difficulties of finance—the early hours of attendance at classes, a tradition which long survived (scholars were obliged to go to the garden “at four or fyve o'clock that they might be tymously back to open and attend on their masters' shops”)—and, finally, of SUTHERLAND's death in 1719. He was succeeded by the PRESTONS, by CHARLES ALSTON, and by Dr. JOHN HOPE, an early and enthusiastic supporter of the LINNAEAN system, who in 1779 erected the monument to LINNAEUS which now stands beside the Palm House. HOPE was a distinguished and able scientist but published little. An amusing memento of him appears in KAY's “Portraits,” where he is figured addressing his gardener. It was Dr. JOHN HOPE who instituted the University Hope Prize, a gold medal for the best collection of native plants made by a student, and it is interesting to record that the first recipient of this prize was ARCHIBALD MENZIES, who, after studying under HOPE in Edinburgh, became a surgeon in the Navy and later accompanied VANCOUVER in the “Discovery” on his momentous voyage round the world. How MENZIES pocketed a few nuts which were on the table for dessert when he dined with the Spanish Viceroy in Chile, planted them in a frame on board ship and so introduced the Monkey Puzzle to Europe is a well-known story. It was during HOPE's term of office (1763) that the Physic Garden was moved to a new site in Haddington Place off Leith Walk. Here a range of Plant Houses was erected and by this time many tropical plants were grown in the garden. The plant, however, which seems to have aroused the enthusiasm and interest of the citizens of Edinburgh and to have attracted crowds to the garden is the Telegraph Plant, *Desmodium gyrans*, the reason of course being the continually revolving leaflets. HOPE was succeeded by RUTHERFORD, the eminent chemist and discoverer of nitrogen, and nephew of Sir WALTER SCOTT, and he again by ROBERT GRAHAM. Not many years elapsed until it became necessary once more to move the garden to more spacious and more convenient quarters, and after a good deal of discussion, part of the present site in Inverleith was chosen and the plants were removed there in 1823. The work of removal took two years and was entrusted to WILLIAM McNAB, then Curator, who carried it out in a most expeditious and successful manner. Some very large plants were transferred, the Royal Palmetto Palm, *Sabal Blackburnianum*, now occupying the centre of the Tropical Palm House, being one of them, and the large Yew standing at the western end of the Students' Collection another. The Yew is known to have been growing in the Physic Garden at the foot of the Calton Hill, and may quite possibly have been planted originally by SUTHERLAND.

himself. It is interesting to record that ROBERT FORTUNE, whose early expeditions to China furnished gardens with several interesting plants which are still commonly grown and to whom the world is indebted for the introduction of various varieties of Tea to India, was for two years a pupil under McNAB.

But perhaps the best remembered among those who have occupied the post of Principal Gardener or Curator was G. DON, who held office for a short time prior to McNAB, from about the end of 1802 until 1806. DON was a botanist rather than a gardener and "during his short life he did more than any other individual has ever done in stimulating the study of the botany of his native country, especially of the Highlands." His discoveries and reputed discoveries are still frequently a subject of discussion among British botanists. A biographical memoir by G. CLARIDGE DRUCE was published in the Notes from the Royal Botanic Garden, Edinburgh, in 1904.

Thirty years after the garden had been moved to Inverleith it was extended by the addition of an adjoining garden which had been occupied by the Caledonian Horticultural Society. This is part of the present garden which includes and surrounds the Rock Garden, and the old meeting house of the Society still does duty as the Herbarium. Later a further extension was made when Inverleith House and the adjoining slopes were presented by the city as an Arboretum. It is only some forty years since the dividing walls were removed and the whole area was thrown into one to form the present garden which, as has been mentioned, now extends to over sixty acres.

GRAHAM was succeeded by J. HUTTON BALFOUR, who did much to enhance the reputation of the garden as an academic centre. He instituted demonstrations of microscopic objects and physiological experiments. Among his publications, his voluminous Class Book of Botany is a treasury of information and his botanical excursions with his students are often remembered. BALFOUR was largely responsible for the activities of the Oregon Association which financed and sent JOHN JEFFREY to collect in Canada. This expedition, although not entirely satisfactory, resulted in the introduction of a number of new plants, and JEFFREY, it would seem, has never been given due credit for the work he did. His story, as far as it can be traced, forms the subject of a recent paper in the Notes from the Royal Botanic Garden, Edinburgh, but the reason why JEFFREY disappeared mysteriously has never been discovered.

The modern development of the Royal Botanic Garden may be said to have begun about the beginning of the present century under the direction of Sir ISAAC BAYLEY BALFOUR, who with vigour and foresight set about its complete reorganization. The Palm House was erected in 1858, but all the other Plant Houses have been rebuilt since 1900 and a modern central system of heating has been installed. Large ranges of houses and frames, not open to the public, are well equipped not only for maintaining the very large collection of temperate, semi-tropical and tropical plants, but also for experimental

work in propagation. The skill of the late L. B. STEWART is too well known and recent to call for special reference here. It was as a rule enough to tell STEWART that so and so had entirely failed to propagate a plant to secure in a week or two a batch of vigorous rooted cuttings.

The reconstruction of the Rock Garden upon a new design began in 1908, and it was rebuilt with stone brought from Callander whenever empty railway wagons were available. The modern trend in many branches of gardening is towards the natural, and in no part of the Royal Botanic Garden is this more evident than in the Rock Garden. An interesting series of photographs illustrates the point. The photograph by A. D. RICHARDSON, who was Curator, shows the Rock Garden as it was in 1894 with its ornamental bridge and formal, well-dressed stones, while bristling with Araucarias; Yuccas and Yews are prominent in the picture (fig. 19). The second illustration of the Rock Garden (fig. 20), from a photograph taken in 1903, shows it at a stage which justified FARRER in writing: "The third style is that of the Devil's Lapful. The finest specimens of this style are to be seen in such gardens as Glasnevin and Edinburgh. The plan is simplicity itself. You take a hundred or a thousand cartloads of bald square-faced boulders. You next drop them all about absolutely anyhow: and you then plant things amongst them. The chaotic hideousness of the result is something to be remembered with shudders ever after." The third photograph, taken in 1938, is of the same part of the Rock Garden (the *Rhododendron ferrugineum* horse-shoe mound) (fig. 21), and shows the latest stage in its development, in which rocks have become a less obvious consideration and rough unhewn stones carefully laid in their natural bed and well concealed by plants are used to suggest the idea of an open, stony, alpine slope. The Rock Garden, which has recently again been extended, now covers some three acres of ground and, with more than three thousand different species, is one of the richest in the world. In the new Heath Garden, varied with taller shrubs which break the contours, forms of Heath and Heather have been planted in large groups. These are sufficient in number and variety to give colour almost throughout the year. To the north of the Rock Garden is the Moraine or Scree where plants from drier countries, like *Asperula arcadiensis*, *Omphalodes luciliae* and *Lewisia brachyaleyx*, and plants of a cushion habit, like *Androsace carnea*, *Acantholimon ornatum*, *Draba imbricata* and *Dianthus microlepis*, are afforded ample drainage, and instead of rotting in the dampness of our winter climate many of them survive. Space forbids the mention of rock garden plants in detail: plants from almost every country in the world grow happily side by side. *Silene acaulis* from the Scottish hills; Saxifrages from the Alps; *Erinacea pungens*, the Spanish Hedgehog Plant from the South of Spain; Phloxes and Lewisias from America; Primulas, Meconopsis, Nomocharis, autumn-flowering Gentians and Cyananthus from India and Western China; Raoulias and Celmisas from New Zealand—are among those which conditions in Edinburgh seem specially to favour. Before passing from the Rock Garden particular attention may be

directed to its northern face, until some years ago considered an impossible place—impossible except for the Ivy with which it was covered—but now enriched with many of the rarer and more beautiful of recent introductions which have been successfully established here.

In the Woodland Garden, where they enjoy some protection from wind and sun and frost, species of Rhododendron flourish under an open canopy of trees—species raised from seed collected in Western China and Tibet by WILSON, FORREST, ROCK and WARD. Here, and in the shelter of the Yew hedges near Inverleith House, are most of the Rhododendrons in the collection for which the garden is noted (fig. 22). These Rhododendrons—more than other plants perhaps—recall the close association between the garden and the late GEORGE FORREST. He made his headquarters in Edinburgh, where he was fortunate in having the collaboration of Sir ISAAC BAYLEY BALFOUR and of Sir WILLIAM WRIGHT SMITH, who is now Regius Keeper. FORREST's seven expeditions to China from 1904 to 1931 had as their result an enormous influx of species new to cultivation, and it may be said with truth that the new introductions of the century have completely revolutionised ideas and methods of horticulture. One new development is the modern Woodland Garden, a form of gardening which has already attained great popularity, and of which the Woodland Garden at Edinburgh is an early and pleasing example, although perchance situated near the centre of a town. Reference may also be made to another experiment which has met with not unhappy results—the growing of dwarf Rhododendrons and other small ericaceous plants, some of the rarer Primulas (*P. sonchifolia*, for example), and other rare species like the Japanese *Pteridophyllum racemosum* of the Poppy family, on peat and leaf mould, wedged among the prongs of upturned stumps of large trees. To form the "Rootery" stumps were piled one upon the other arranged in irregular terraces at different levels, and the upturned projecting roots provide sheltered pockets specially favoured by certain species which here grow profusely. Another recent experiment provides for the growth of similar plants on a series of terraces bordered by walls of peat. This too has proved to be a successful and attractive method of cultivation.

I have written of the most outstanding features of the garden. At almost all times of the year there is colour, but the garden is certainly at its best about the middle of May when many of the plants in the Rock Garden are in flower; from March to September there is no lack of interest out of doors, and in midwinter there are always some of the indoor plants in bloom.

For scientific work the garden is well equipped. The Laboratories for research are spacious and modern and, although the building which houses the Herbarium is an old one, the collection of specimens (about one and three-quarter million) is a good representative one of the plants of the world. The Herbarium is specially rich in material from India and China and in certain genera such as Rhododendron and Primula. The Library contains some 18,000 volumes and

Photo, R. M. ADAM.]

FIG. 18.—EDINBURGH BOTANIC GARDEN VIEW FROM THE HILL
(See p. 77.)

[*To face p. 82*





Photo, A D RICHARDSON.]

FIG. 19.—EDINBURGH BOTANIC GARDEN : THE ROCK GARDEN AS IT WAS
IN 1894



Photo, R. M. ADAM.]

FIG. 20.—EDINBURGH BOTANIC GARDEN : THE ROCK GARDEN AS IT WAS
IN 1903.

(See p. 81.)



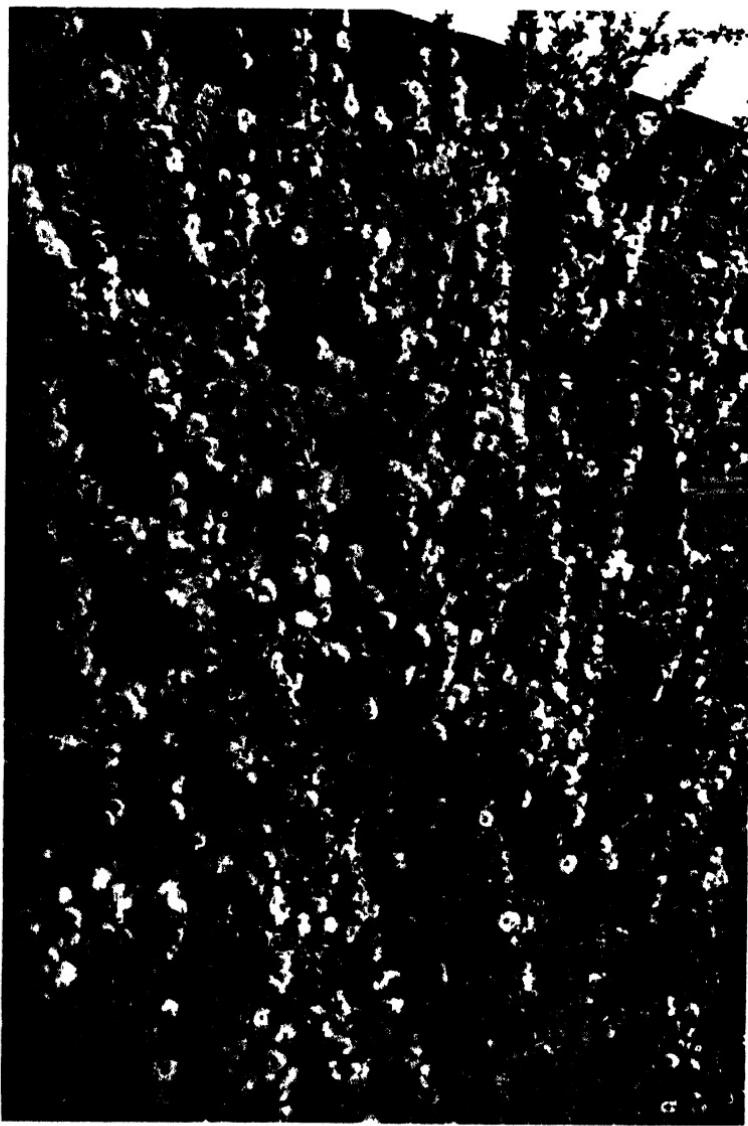
Photo, R. M. ADAM]

FIG. 21.—EDINBURGH BOTANIC GARDEN THE ROCK GARDEN AS IT WAS IN 1938.
(See p. 81)

Photo, R. M. Adam]

FIG. 22.—EDINBURGH BOTANIC GARDEN RHODODENDRONS NEAR INVERLEITH HOUSE.
(See p. 82.)





Photo, R. M. ADAM.]

FIG. 23 - PRUNUS TRILOBA AT EDINBURGH.
(See p. 97)



FIG. 24.-*EXOCHEORDA KOROLKOWII.*

(See p. 97.)



[*Photo, N. K. GOULD*]

FIG. 25.—APPLE 'ONTARIO' AT WISLEY, 1939.

(See p. 87)

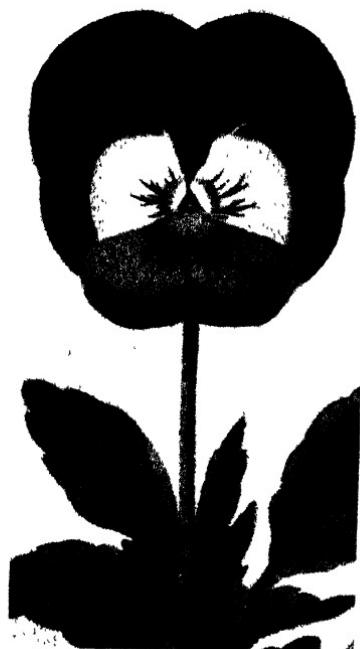


FIG. 26.—ALLEN'S JOHN BULLI



FIG. 27.—MOUNTJOY'S BEAUTY OF EALING.



FIG. 28.—MASTERPIECE.

(See p. 84.)



FIG. 29.—THOMPSON'S VICTORIA.

[To face p. 83.]

subscribes to a wide range of botanical periodicals and journals. Many problems are submitted by the public to the scientific staff—plants to name—diseases to diagnose—we have been asked to examine a sample of hay to say whether it was the cause of an illness in cattle—to identify a fragment of wood from a Roman camp, which turned out to be Turkey Oak and showed that some Roman soldier had brought his favourite axe with him—to examine a foreign body removed from a woman's nose, which proved to be a splinter of ash from a hockey-stick and recalled an accident that happened twenty years earlier—to diagnose the contents of the victim's stomach in a suspected murder case, and these turned out to be mainly oats and aniseed, the ingredients of a well-known rat poison. Much of the published work emanating from the garden deals with the systematic side of Botany and appears in the Notes from the Royal Botanic Garden, Edinburgh, and in the Transactions of the Botanical Society of Edinburgh. Since the beginning of the present century more than 1,700 new species have been described in these journals. The Department of Botany of the University of Edinburgh enjoys the use of the lecture halls, laboratories and library, and every year some two hundred medical students attend classes at the garden. Students in Arts, Pure Science, Forestry and Agriculture also take part of their course at the garden. Classes in various branches of horticulture are held in the evenings, and these are attended mainly by student-gardeners, of whom over forty are employed on the garden staff. They spend three years in practical and theoretical training, and those who secure a high percentage of marks are awarded a diploma; many of these students eventually go abroad.

The Royal Botanic Garden, Edinburgh, has thus its various functions to fulfil—as a scientific institution conducting its own research; as an academic centre for University and other students; as a training ground for practical gardeners; as a garden where experiments in horticulture are conducted and where, in the maintenance of a large botanical collection, the aesthetic side is given due consideration; lastly, the Botanic Garden serves its purpose as the lung of a great city, a park open to the public daily without charge, and its visitors now number about a million every year.

IN THE LINDLEY LIBRARY.—I.

PANSIES OF YESTERDAY.

By R. E. HAY.

IT is an interesting fact, although easily understood, that books and articles about books are everywhere popular, and it is the Editor's hope that the brief stories about some of the more unusual and amusing books in the Lindley Library which it is proposed to publish at intervals under the above title will be welcomed by the readers of the JOURNAL. The books thus singled out to stand with the spotlight of editorial publicity upon them are not necessarily the most rare or costly volumes in the Society's possession, nor, indeed, are they characterized by great antiquity. The common reason for their selection is that they possess a hidden background of human history, or mark some milestone in the march of human knowledge, art, garden practice, or horticultural fashion. It is with the hope that those who are already the fortunate possessors of the books to be discussed may view their old friends with a new understanding ; those who have them not may spend many a pleasant hour in their pursuit and acquisition ; while those for whom the antiquarian bookseller's dusty shelves hold no allure can spend a rainy day at Vincent Square and make acquaintance with them in the Lindley Library.

To commence this series—for it is hoped that readers of the JOURNAL will encourage the continuance of these stories about the lesser known books—a book has been chosen for its unique position in the literature of florists' flowers. It is a small octavo volume bearing the proud, if somewhat pretentious, title “A History and Description of the Different Varieties of the Pansey or Heartsease now in Cultivation in the British Gardens.” It was written by J. SINCLAIR and J. FREEMAN and published in twenty-four monthly parts. The date of publication on the title page is 1835, which, according to HARMAN PAYNE, gives it the distinction of being the first book devoted solely to the Pansy. It marks the point in history at which the Pansy had just struggled into the ranks of florists' flowers—a point that is usually overlooked by modern horticultural historians who give it scant attention. The little volume, written by SINCLAIR in the easy man-to-man style that has died away in modern gardening journalism, is embellished with literary quotation, sometimes a little far-fetched in its application, but all through the driving spirit of enthusiasm sustains the reader and makes him wonder what manner of men were these ancient florists.

With the exception of REGINALD FARRER's works, which stand in a category apart and have their admirers and detractors, modern garden literature cannot claim to equal that of a hundred years ago in forth-right challenging statement or scintillating enthusiasm.

Even such devotees as SINCLAIR and FREEMAN realized after about a year that the Pansy had not sufficient of those whims and fancies in its cultivation to sustain interest in a publication solely concerned with it. So in January, 1836, we read : "It is our intention in future, in order to make this work more interesting, to devote a certain portion of its pages to the treatment of any other new or rare plants which may have been introduced into this Country. This may be more interesting to some than to fill it upon the Heartsease alone, the propagation of which is already well known to almost every individual, from John-o'-Groats to the Lands-end in Cornwall." It was decided to start with notes on the Camellia, and the authors begin by affirming : "We sit not down to quote from any other Author on this subject, but to deliver in good plain English the results of our own practical experience, for the use of those who may not be much acquainted with its treatment."

But even more interesting than the text are the twenty-four plates ; they are good examples of early nineteenth-century lithography and each one is full of individual charm. Such names as the 'Iver Hero,' 'Thompson's King,' 'Lamb's Mountaineer' and 'Mountjoy's Beauty of Ealing' belong to a more spacious age when recommendations for the naming of garden varieties were still unknown and gardeners could still spare the time to read the raiser's description of a plant to ascertain its colour ! Four interesting examples of the plates are reproduced in figs. 26-29.

The book is scarce but not fabulously costly. One supposes from the infrequency of its appearance in bookshops that the edition must have been small. Its contribution to horticultural knowledge may be slight, but its historical interest is surely sufficient to warrant its descent occasionally from the library shelves to be perused in moments of quiet and reminiscent mood.

LESSONS FROM THE WISLEY FRUIT TRIALS.—I.

By J. M. S. POTTER, N.D.H., Fruit Trials Officer.

THE Fruit Trials at Wisley began in 1923 under the supervision of a Joint Committee of the R.H.S. and the Ministry of Agriculture. While they were primarily intended for the commercial fruit growers, at the same time they provide information very necessary to the owner of a private garden who easily becomes bewildered among the competing superlatives of the nurseryman's catalogue. The trials are, of course, intended to provide an unbiased test of the new varieties of fruit that are introduced, but since the method of experiment must be by way of comparison with existing varieties incidental light is thrown upon some of the old-established favourites.

The standard procedure is to obtain the variety from its raiser and propagate it at Wisley in order to make sure that the comparisons

are not vitiated by differences of stock or age. Sometimes indeed the material thus obtained is not wholly true to type or is in part affected by virus, especially among Strawberries and Raspberries, so that selection before propagation is essential to secure a true starting point. If the variety under trial shows good promise it is again propagated and introduced into the trials at the eight sub-stations situated in various parts of the country, thus to bring to light differences due to soil or climate. The differences of rainfall and temperature between the East and West of England, or between England and Scotland, have specific effects with some varieties, but, except for the limitations of Apples and Pears as one goes north, the varieties that succeed in the trials at Wisley generally hold their own elsewhere. It is an astonishing fact that fruit of any kind should succeed at Wisley, considering how poor the soil is from an agricultural point of view ; indeed one portion of the trials lies on land that before was heath and in all probability had never previously been under cultivation. The use of artificial fertilizers, particularly of liberal supplies of potash, has made it possible to get crops out of this land, so light that in dry weather one sinks ankle deep into the soil. One also has to credit a good deal to the water table which is only a few feet below the surface, because of the River Wey close alongside.

It is often objected that these trials take too long to arrive at results. Black Currants, for example, may be propagated in the year of receipt and planted out a year later, but not until they have fruited in the fourth, fifth and sixth years can any judgment be formed on their cropping power and other characters. Apples and Pears take longer still—even ten-year-old trees do not finally sum up their eventual behaviour. But these delays are inevitable, inherent in the nature of the work ; however much the raiser of a new variety desires to have its merits trumpeted abroad, time is part of the essence of the contract in forming a judgment. Doubtless a man of experience can arrive at a useful opinion from what he sees of the trees in the first year or two of their fruiting, and the Trials do provide such an opportunity of seeing new and old varieties growing under comparable conditions. Indeed, no reports can give the intimate information a skilled eye can obtain by personal examination of the Trials, and fruit-growers on either small or large scale as yet hardly realize what a valuable opportunity is provided by the Wisley Fruit Plantations.

The following series of short articles will deal with the results of the Trials from the point of view of the private gardener who is on the whole more concerned with fine quality and regularity of bearing than with such market factors as colour, capacity to travel and gross weight per acre produced.

APPLES.

No garden however small should be without Apple trees, and the common objection that they take up too much room and interfere with the cultivation of the vegetables is at once removed if they are grown as cordons on the Malling stocks I or II, or on No. IX on strong soils.

No more charming feature can be found in a garden than a double row of Apple cordons on either side of a grass path. Cordons also enable the amateur to secure variety and a succession throughout the season ; the trees can be sprayed with a knapsack, and the fruit is easy to protect and gather. When one comes to the selection of varieties one can run light on Cooking Apples ; there are several varieties of what might be called dual purpose Apples that are of finer flavour in the pie.

Among the early Dessert Apples there are two of Canadian origin which have done well at the Wisley Trials and are well worth the amateur's attention—' Melba ' and ' Patricia.' ' Melba ' is a largish Apple, yellow with crimson stripes, often brilliant in colour, and with extremely soft flesh—indeed one can poke one's finger into it. It is fresh, juicy and sweet, with the peardrop or fruit essence flavour which characterizes American Apples. ' Patricia ' is another highly coloured Apple, very prolific and slightly below medium size, ripening a little later than ' Melba.' Both of these are fruits for those who like the soft American type of Apple and may replace the old varieties ' Gladstone ' or ' Lady Sudeley.' There is a little gap before the next varieties, ' James Grieve ' and ' Ellison's Orange,' are reached, to cover which the new variety ' Laxton's Epicure ' may be used. Then comes ' Lord Lambourne,' a recent Apple which has shown up well in the Wisley Trials. It is a shapely Apple of normal dessert size, rich in colour, fresh and juicy, with some aroma and flavour, though it does not long remain at its best. Then ' Cox's Orange Pippin ' comes into season, and though it is a hundred years old or more the Wisley Trials have happened upon no other fruit so good. It is closely followed by ' Laxton's Superb,' another recent Apple which has amply proved itself in the Wisley Trials. Neither in colour nor flavour does it equal Cox, and it requires a little management to keep it within bounds as a cordon, but it is a great cropper. Among the older dual purpose varieties should be included ' Charles Ross,' specially useful on chalky soils, ' Ontario ' (fig. 25), a late-keeping Canadian Apple which is being taken up by some of the commercial growers, and ' Allington Pippin,' a great cropper and good to eat when fully ripe but of all Apples the one that makes the finest flavoured pies.

The Trials have not as yet revealed any really late dessert Apples that can be wholeheartedly recommended. It was hoped that ' St. Cecilia ' would fill the bill, but it is too susceptible to damage from sulphur washes. The Apple fancier should, however, add ' Belle de Boskoop ' and ' Orleans Reinette.' For kitchen purposes ' Arthur Turner ' has earned very good marks in the Trials, it is a large green Apple, which one can begin to pick in August and continue gathering until the end of September. For late keeping cookers, ' Monarch ' and ' Crawley Beauty ' have answered well in the Trials. The latter also flowers so late that it is almost proof against frost. The amateur should also include ' Edward VII,' an older variety, but of exceptional flavour when cooked, and of course ' Bramley's Seedling ' and ' Lane's Prince Albert ' cannot be dispensed with.

NEW RHODODENDRON HYBRIDS.

OWING to the cessation of the publication of the Rhododendron Association's Year Book for the duration of the War, the following list of hybrids recorded during 1939 is published for information and registration.

NAME.	PARENTAGE.	RAISER OR EXHIBITOR.
CALROSE . . .	calophytum × Griersonianum . . .	ABERCONWAY
CHASTE . . .	campylocarpum × Queen o' the May . . .	CROSFIELD
ELISABETH . . .	Griersonianum × repens . . .	ABERCONWAY
EURIDICE . . .	arboreum album × Loderi . . .	ROTHSCHILD
GAUL . . .	Shilsonii × Elliottii . . .	"
GAY GORDON . . .	Beau Brummell × Elliottii . . .	"
GEISHA . . .	Pineapple × dichroanthum . . .	"
GIBRALTAR . . .	Bibiani × Elliottii . . .	"
GIPSY KING . . .	King George × haematodes . . .	"
GLAMOUR . . .	Margaret × Griersonianum . . .	"
GOBLIN . . .	Break of Day × Griersonianum . . .	"
GOLCONDA . . .	Beau Brummell × dichroanthum . . .	"
GOLDEN HORN . . .	dichroanthum × Elliottii . . .	"
GOOD CHEER . . .	Lord Milner × sutchuenense . . .	"
GRACE . . .	Fortunei × arboreum album . . .	"
grenada . . .	Lady Rumbold × Griersonianum . . .	"
grenadier . . .	Moser's Maroon × Elliottii . . .	"
grenadine . . .	Pauline × Griersonianum . . .	"
GRIEROCASTER . . .	Griersonianum × Doncaster . . .	G. H. LODER
GRISETTE . . .	arboreum album × Dr. Stocker . . .	ROTHSCHILD
HAMPRESTON . . .	glaucum × russatum . . .	MARCHANT
HELEN VANDEVERE . . .	Griersonianum × occidentale . . .	VANDEVERE
JAQUETTA . . .	facetum × Griersonianum . . .	DIGBY
JOCK . . .	Williamsianum × Griersonianum . . .	STIRLING-MAXWELL
JULIANA . . .	Griersonianum × Queen Wilhelmina . . .	INGRAM
LADY STAIR . . .	Griersonianum × Albatross . . .	STAIR
LITTLE BERT . . .	repens × euchaites . . .	SCRASE-DICKENS
LODAURIC . . .	Loderi × auriculatum . . .	CROSFIELD
MATADOR . . .	Griersonianum × strigillosum . . .	ABERCONWAY
MEROPS . . .	Cunningham's Sulphur × lacteum . . .	INGRAM
RED ROVER . . .	J. G. Millais × Thomsonii . . .	WHITAKER
ROSEFINCH . . .	Bella × Griersonianum . . .	ABERCONWAY
ROSY DAWN . . .	Thomsonii × Fortunei hybrid . . .	CROSFIELD
SEA NYMPH . . .	chaetomallum × dichroanthum . . .	INGRAM
WHITE WINGS . . .	bullatum × ciliicalyx . . .	SCRASE-DICKENS
WINSOME . . .	Humming Bird × Griersonianum . . .	ABERCONWAY

FURNISHING A NEW GARDEN.

By J. COUTTS, M.B.E., V.M.H.

IN the February issue of the JOURNAL Sir DANIEL HALL discussed garden-making from old pasture, so, assuming the site consists of ground that was in rough grass and has been prepared by trenching, the first thing to do is to get out a plan for the proposed layout. If the ground is practically level, or if it is desired to have it level, the first thing to do is to correct any unevenness, that is unless the area is of sufficient extent for a portion of it to be left in natural and easy undulations.

If the ground is on a more or less steep slope, it may be necessary to lay it out in two or more different levels ; this will necessitate the use of some sort of retaining wall or walls. Such walls may be brick built or in stone if easily obtainable in the neighbourhood. Dry stone walls can form a charming feature, as a great variety of rock garden plants can be grown to perfection on them.

When laying out a small garden it is important to keep it as simple as possible, for such gardens are usually rectangular in shape, separated it may be from other gardens by a hedge or fence of some sort. From this it follows that the correct thing to do is lay out the garden in straight lines.

If for our smallest garden we take a piece of ground some 40 yards deep by 20 yards wide, this may be regarded as the average size for a small detached house ; for our present purpose this may be doubled or trebled in size. Whatever the size, the broad principle should be the same, with the only difference that the larger area will allow more scope for interior layouts and additional paths may be considered necessary.

For the smallest area of ground, the simplest way is to have a path down the centre of the plot and one round the dwelling house.

The dividing fences should, or can have borders running the full length of the plot, with corresponding borders on each side of the centre path, with a portion of lawn in between or, according to individual taste, the lawn may come right up to the path.

The borders may be devoted to a collection of choice shrubs, Roses or herbaceous plants according to the taste of the owner. In the smaller piece of ground, 6 feet is a suitable width for the borders if four borders are planned, that is 8 yards out of the total width. In the larger space they can be correspondingly wider, thus allowing more scope for the use of larger plants to form a screen to adjoining property.

If it is desired to devote any space to vegetable growing, it should be at the far end of the garden and may be screened off by a hedge or

trellis work of some sort covered with Roses or other plants. A screen of cordon Apple trees could also be considered. The first consideration in the proposed layout is the paths ; if there is one expensive item in garden making it is the construction of good garden paths. For this reason they should be reduced to the minimum consistent with convenience of working. For the average small garden, 5 feet in width should be ample and, as I have already suggested, the main path should run down the centre of the plot. If there is a French window on the garden side of the house, it should make a good focal point, but the site of the path may have to be varied according to the position of the house. Then there should be a path and a border round the house, the border 2 or 3 feet in width, for the accommodation of choice wall shrubs, or it may be bulbous plants. Where there is a porchway or other projection from the main building, deeper recesses may be formed for the reception of choice plants.

Here a word of warning is necessary. When making such borders, do not on any account get the soil above the wall ventilators and damp course. Also, if it is desired to train plants on the walls, have a wooden trellis fitted, or, better still, have the walls wired.

Now for the paths. If one has had sufficient foresight, the site should not have been trenched, thus ensuring a solid foundation for them. The soil should be removed to a depth of at least 6 inches and will come in useful for levelling. This depth allows for 4 inches of rough clinker or other material for drainage, which should be well rammed or rolled down, and then finished off with at least 2 inches of good gravel. This should make a good permanent path, and there is nothing more pleasing than a good gravel path.

If the site is low and wet, it may be necessary to drain the path, while on very steep ground drains may be necessary to carry off storm water.

As an alternative, the path round the house may be paved with bricks or York stone paving. This naturally is more expensive. Above all, avoid that crazy thing known as crazy paving which has been so much overdone. It is supposed to be an excellent medium for growing low carpeting plants ; true, to a certain extent, but it also is a sort of Elysian field or home for all sorts of weeds which can never be eradicated even at the expense of much hard labour and language, not at all suited for the peace of the garden. If crazy paving is used, it should be cemented down, leaving some planting pockets along the sides for the accommodation of low-growing plants. This gives it an informal appearance and leaves the centre free for one to go about one's lawful occasions.

Wherever the borders come alongside the paths, I like to see them edged with stones. They can then be planted with a great variety of trailing plants which can be allowed to grow over and make a charming, informal edging. I had this in mind when I suggested what some may consider rather wide paths.

Failing stones, one can use bricks or tiles ; indeed, much as I dislike

it, I would not hesitate to use home-made concrete blocks, for they would soon be hidden by the edging plants.

Where flower borders bound a lawn, I would suggest edging them in the same way, cutting away in front some 9 inches of turf and filling in with gravel; thus the dwarf edging plants can be allowed to grow over in an informal way, without spoiling the grass or interfering with the mowing machines. Another alternative is to have a paved path between the lawn and the border.

Just what is grown in the central borders depends entirely on the taste of the owner; some may favour a collection of Roses, others a collection of herbaceous plants. If the latter, care should be exercised in the choice of suitable plants, tall, coarse growing subjects being out of place and they, if desired, could be better accommodated in the side borders.

With a view to the future upkeep, choose so far as possible plants that require the minimum of attention in respect of staking and tying.

If keen on rock garden plants, there is no reason why the centre borders should not be devoted to them. No elaborate arrangement is needed; indeed, such would be out of place. A low mound not more than 18 inches to 2 feet high should afford ample scope for a pleasing arrangement and varied aspects, in fact there is no reason why such an arrangement should not in places extend on to the lawn.

The side or boundary borders are, in my opinion, best suited for a collection of choice shrubs, or where space allows, a number of the smaller growing flowering trees; they are permanent and frame the garden, and at the same time form a screen to adjacent property. Of course, the larger the garden the deeper and more effective such planting will or should be. Also, with more space inside the garden, there should be room for beds of shrubs or specimens of flowering trees, of which there is a wide choice suitable for any moderate sized garden.

As regards boundaries, who would not like an old wall, or it may be a piece of woodland or spinney at one end? That, I am afraid, is for many of us one of the things we must dream about.

Perhaps the next best thing to a wall is a 6-foot fence of oak pales. It is pleasing if allowed to weather naturally; if treated with some suitable preservative it has a reasonably long life, it gives good shelter, ensures a certain amount of privacy and is useful for training plants on.

Then there are hedges, very suitable if there is room for them, but I will have something to say about them later on.

Having dealt with the broad outlines of the general layout, which can only be general when dealing with an imaginary garden, in which I have tried to indicate some of the pitfalls into which the garden maker is likely to fall, I will now deal with some of the permanent aspects and plants suitable for a small or moderate sized garden, but before doing so, I must again warn readers that one can only generalize, as soil and situation can and do vary considerably within a short distance in any one district.

For this reason, it is a good policy to find out something about the

local conditions ; above all, get down to and understand the limitations of one's own particular garden. If on a calcareous soil, why hanker for Rhododendrons and other ericaceous plants when there is a wide choice of good plants that will thrive under such conditions ? For example, all the large family of rosaceous plants is happy on chalky soil and, of course, many others. As already indicated, soils vary considerably ; light, sandy and peaty soils are usually more or less acid in character, therefore well suited for all ericaceous plants. Naturally they will grow other plants as well, but many light sandy soils are so deficient in humus that they must be enriched by the addition of rotted farmyard manure, when it can be obtained. Failing this, use decayed leaves and material from the compost heap ; spent hops are also excellent for such soils. Cold, heavy clay soils may require draining and opening up with long straw manure or other opening material to assist aeration.

Planting.—All deciduous trees and shrubs can be safely planted during autumn, winter and early spring when soil and weather conditions are suitable ; evergreens are best planted during September and again during the spring, April and May being good months. Evergreens especially may in the first season require watering during spells of dry weather.

When planting, always take out a hole large enough to enable the roots to be spread out to their full extent. Plant firmly and avoid planting too deeply, never deeper than the plants were in the nursery as even a few inches prove fatal to many plants, especially Rhododendrons and Azaleas. Always allow room for each plant to develop to its full capacity ; it is a waste of money to plant twice as many plants as are really needed, with the idea of covering the ground quickly, and the surplus plants are seldom removed in time, as one's good intention was when they were put in, with the result that the permanent plants are usually spoiled.

The intervening spaces can, for the time being, be cheaply filled in with suitable herbaceous plants or a ground covering of dwarf, shrubby plants. Always purchase from a good nursery, even if it costs a little more ; any slight initial expense is cheaper in the long run and any good nursery always has experts who are prepared to advise one about plants suitable for any particular soil or situation.

Lawns.—We may take it for granted that a good lawn is one of the most pleasing features of any garden and it is worth going to some trouble to ensure the best conditions for its ultimate success. The ground allocated for it should be carefully levelled and consolidated by treading or rolling. Seed should be sown as early in March as soil and weather conditions will permit, or, better still, during September. Do not on any account be tempted to buy cheap mixtures ; go to a good establishment, tell them what class of soil you have, or better still, send a sample, and then you can depend on them to supply a suitable mixture ; avoid mixtures including Rye grass. Turfing is often unsatisfactory unless one can get really good turf, native to one's particular

soil and free from weeds, and, above all, remember that a good lawn requires a lot of attention as regards weeding, manuring and general upkeep.

Hedges and Screens.—In small gardens they should be used with restraint as they take up much valuable space and many of them are great robbers of the soil. As a boundary hedge against the roadway, there is nothing better than a Holly hedge and it is, if manured and well cared for, much faster growing than most people imagine. Again, a well-kept hedge of Thorn or Quick takes some beating, while *Pyracantha Rogersiana* gives promise of being ideal for such a situation, flowering and fruiting freely. As an interior hedge where space is limited, *Cotoneaster Simonsii* is ideal. *Lonicera nitida* is cheap and largely used and stands, indeed benefits, from close trimming, but it does not succeed everywhere; better still for a small garden is the variety *yunnanensis*. Where space permits *Berberis stenophylla* makes a beautiful evergreen and flowering hedge; the longest shoots should be cut out immediately after flowering. *Berberis Darwinii* is also good, but inclined to get open at the bottom. *Berberis Hookeri* var. *latifolia* is also ideal for an evergreen hedge up to 6 feet, as also is *Berberis Thunbergii* var. *atropurpurea*; in fact there are quite a number of good Barberries suitable for hedges. Inside the garden, away from stock, Yew is still one of our best hedge plants.

Climbing and rambling roses can be used as screens but they entail considerable seasonal work as regards pruning and tying. *Lonicera japonica* var. *Halliana* is quick growing and soon covers a fence or trellis-work. There are, of course, many more suitable plants, but above all, avoid planting *Cupressus macrocarpa*, which is much over-rated for this purpose; it has a bad habit of dying off in patches, due, I imagine, to close trimming with the shears. As a large informal screen it is excellent, with the longer shoots shortened back occasionally; it succeeds near the sea and on chalky soil.

Planting out screens in small gardens is a problem as there is rarely room for effective planting. Where evergreens are required, *Cupressus Lawsoniana* and *Thuja gigantea* are as good as any, the former for preference. If required, they can be trimmed in hedge form and kept to any required height; large plants of both are expensive and demand careful transplanting.

Flowering Trees and Shrubs.—There is such a wealth to choose from that in the short space at command it is difficult to make a suitable selection, but any list should include such plants as flower during winter and early spring; they include the 'Winter Flowering Jasmine,' *Jasminum nudiflorum*, *Hamamelis mollis*, which is usually in flower at Christmas, *Lonicera fragrantissima* and *L. Standishii*, but they are so much alike that only one is required. In cold districts they are worth the shelter of a wall, as also is the 'Winter Sweet,' *Chimonanthus fragrans*. We also have *Daphne Mezereum* and its variety *alba* and *Viburnum fragrans*, also the evergreen *Laurustinus*, *Viburnum Tinus*, which makes a fine informal hedge, while *Sarcococca Hookeriana* and

S. humilis are low-growing evergreens with small white, sweet-scented flowers ; also several species of *Corylopsis*, and a small tree in *Prunus subhirtella* var. *autumnalis*. From the following, one should be able to make a selection suitable for most gardens.

Flowering Shrubs.—Rhododendrons, Azaleas and Heaths in great variety, where soil conditions are suitable or can be made so. *Aesculus parviflora*, *Berberis aggregata*, *B. candidula*, *B. concinna*, *B. Darwini*, *B. dictyophylla* var. *albicaulis*, *B. polyantha*, *B. rubrostilla*, *B. stenophylla*, of which there are several dwarf varieties suitable for small gardens, also *B. subcaulialata* and *B. Thunbergii* and var. *atropurpurea*. *Buddleja alternifolia* and *B. Davidii* var. *magnifica* and the new 'Ile de France' ; *Caryopteris clandestina*, *C. incana* (*Mastacanthus*), *Ceanothus* 'Gloire de Versailles,' 'Marie Simon' and 'Topaz,' *Ceratostigma Willmottianum*, *Cistus* and *Helianthemums* are very useful for covering hot dry banks, but some of the former are not very hardy, but the following are a few of the best, viz.—*Cistus corbariensis*, *C. cyprius*, *C. Loretii*, *C. populifolius*, *C. purpureus* and *C. salvifolius* ; *Cotoneaster bullata*, *C. Henryana*, *C. horizontalis*, *C. lactea*, *C. microphylla*—good for covering walls and banks—*C. rotundifolia* and *C. Simonsii*. The *Cytisus* include many beautiful Brooms such as *C. albus*, *C. praecox*, *C. scoparius* (Common Broom), of which there are many fine varieties, such as *Andreae*, 'Firefly,' *fulgens* and *sulphureus* ; among the many new Brooms with crimson and rose flowers *C. Burkwoodii* is one of the best. *Diervilla (Weigela)* includes several fine varieties, ranging in colour from crimson, rose, pink and white. *Escallonia* provides several good hybrids, also *E. macrantha*, largely used as a hedge plant near the seaside. *Forsythia intermedia* var. *spectabilis*, *Genista hispanica* (Spanish Gorse), is very useful for dry banks ; Hydrangeas where they are hardy should find a place, also *H. paniculata* var. *grandiflora*, which is quite hardy. *Hypericum* includes *H. calycinum*, which is so useful for furnishing shady places under trees, also *H. patulum* and its varieties ; *Magnolia stellata* ; the *Philadelphus* includes many useful plants, especially some of the dwarf hybrids such as 'Avalanche,' 'Belle Etoile,' 'Boule d'Argent,' 'Favourite,' 'Mount Blanc' and 'Virginal,' also the species *P. microphyllus*. *Potentilla fruticosa* includes many fine varieties, some of which should find a place ; *Ribes sanguineum* also includes some good varieties, such as *atrorubens*, 'King Edward VII' and *splendens* ; *Santolina Chamaecyparissus*, valuable for its grey foliage, and, of course, Lavenders, the tall ones making low hedges. *Spiraea arguta*, *S. japonica Bumalda*, 'Anthony Waterer' and *S. Thunbergii* are all suitable for small gardens. A place should be found for some of the fine varieties of Lilac ; they should be given plenty of room and treated as specimens. *Viburnum Opulus* var. *sterile* and *V. tomentosum* var. *plicatus* are worth a place.

Flowering Trees.—Here we have a wide choice of moderate sized trees, such as *Amelanchier canadensis*, *A. laevis*, *Cornus Kousa*, *Crataegus Carrierei*, *C. Crus-galli* and the double-flowered varieties of our common Hawthorn ; *Euonymus europaeus*, *Laburnum Vossii*, *Magnolia*

Soulangiana, *Malus Eleyi*, *M. floribunda* var. *atrosanguinea*, *M. Lemoinei*, *purpurea* and *M. toringoides*. The *Prunus* include the Almond, *P. communis* and its varieties, *macrocarpa* and *Pollardii*; *P. Davidiana alba*, *P. cerasifera* var. *Pissartii*, *P. incisa*, and *P. subhirtella* var. *ascendens*. Room should be found for at least one specimen of Japanese Cherry; there is much confusion as regards names, but *P. Amanogawa (erecta)*, upright as a Lombardy Poplar, is suitable for a small garden. Other good varieties are *P. Fugenzo* ('J. H. Veitch'), *P. Saki-yuma (Hizakura)* and *P. Okumiyako (longipes)*. The *Sorbus* includes several fine small trees such as *S. Aucuparia* (Common Mountain Ash), *S. commixta*, *S. discolor*, *S. gracilis*, *S. Vilmorinii*, *S. Wilsoniana*, while the section (Whitebeam) includes *S. Aria*, *lutescens*, *majestica* and *magnifica* and *S. alnifolia*.

In the space at command it is impossible to give detailed descriptions, but they can be found in any good catalogue. It is also a good plan to go to a nursery and see the plants.

Pruning.—Generally this presents a difficulty not only to amateurs but to many gardeners. It is really very simple when one has grasped the fact that it all comes under three headings. First: plants that only occasionally require the removal of dead and weak shoots to prevent overcrowding. This applies to trees and some shrubs. Always cut branches close back to the main stem and laterals to the main branch.

Second: All shrubs that flower on the previous year's wood should be pruned immediately they have finished flowering. Good examples are *Ceanothus dentatus*, *C. papillosus* and *C. Veitchianus*, usually trained on walls; *Prunus triloba* var. *plena*, *Philadelphus* and *Dierellas*.

Third: Plants that flower on the current year's wood, such as *Ceanothus Gloire de Versailles*, *Tamarix pentandra*, *Clematis Jackmanii*, *Buddleia Davidii* and *Caryopteris clandonensis*, should be pruned back during March, or even earlier, according to locality and weather conditions.

In the space at command I have tried to deal with as many as possible of the sins of omission and commission that the garden maker can fall into, but the secret of all good garden making is the expression of the owner's individuality.

POULTRY FOOD FROM THE GARDEN.

ONE or two enquiries have been made as to what the owner of a garden can grow to supply poultry food and so supplement the scarcity of grain that has already become serious even to those who only keep a small flock to provide eggs for the house. Little increase in the issue of poultry feeding stuffs is to be expected, since materials like Maize and other cereals are mostly imported and tonnage cannot be spared for animal foods when, as in the last war, it becomes difficult to maintain the supply of human food. Even milling offals are likely to become scarcer as it becomes necessary to mill more deeply, *i.e.* to extract more flour from a given quantity of wheat.

The domestic poultry keeper will, of course, be using up all the scraps from the house, and obviously the first desideratum is a supplementary ration of grain. It is, however, not wise to sow small plots of Wheat and Barley in the garden because the sparrows will have all or most of the crop. In the warmer parts of the country it is possible to ripen early varieties of Maize and obtain a fair yield. But it will not do just to sow some of the " Indian Corn " that has been bought for feeding, for that is likely to be a variety that will grow tremendously but will be only beginning to form cobs by September. One of the varieties sold for " Sweet Corn " should be chosen and either raised under glass and planted out towards the end of May when the risk of frost is over, or sown then in the open, 18 inches apart in the rows and 3 feet between the rows. There will be more trash than cobs, but it will be useful for the compost heap.

A small patch of linseed will be valuable as yielding a very rich and concentrated grain, a small quantity of which can be crushed to add to the mash. But River Plate feeding linseed must be sown, not the linseed grown for flax.

Sunflowers again give a fair yield of nutritive seed which can be fed dry. Any of the large flowered kinds will do, but birds, especially tits, may become troublesome as the heads ripen.

On the whole the largest amount of food from a given area will be provided by root crops like Potatos, Carrots and Jerusalem Artichokes. One can grow an extra breadth of these and reserve the misshapen and small roots for the poultry. The Artichokes have the merit of being able to look after themselves with a minimum of cultivation in any waste part of the garden. Carrots supply also a desirable vitamin. To maintain the vitamin supply the poultry keeper should try to obtain some young Clover hay, to be ground and mixed with the mash—one or two per cent. of the other dry food. For the same purpose a breadth of Curly Kale should also be grown and fed green.

THE AWARD OF GARDEN MERIT.—LIII.*

257. PRUNUS TRILOBA.

Award of Garden Merit, June 17, 1935.

This beautiful flowering tree has a rather interesting history since it is doubtful if it has ever been observed in the wild state. When ROBERT FORTUNE was travelling in China about the middle of last century he found the plant widely cultivated in gardens in North China. Both single and double flowered forms are known and the plate in the Botanical Magazine (t. 8061) portrays a beautiful spray of the single blossoms, but the original description of the species by Dr. LINDLEY in the Gardeners' Chronicle for April 18, 1857, is based upon a semi-double variety.

So popular has the double flowered form become that now when gardeners talk of *Prunus triloba* they invariably have the double flowered plant in mind.

It forms a deciduous tree about 15 feet in height, and bears rather deeply toothed leaves which, however, do not appear until after the flowers. The flowers are abundantly produced at the end of March and during early April, and are about 1½ inch in diameter, of a pale shade of rose-pink. The most satisfactory method of growing *P. triloba* is against a south wall; if the shoots are cut hard back immediately flowering is over, a profusion of blossom is ensured. Sometimes it is planted in the open, but it is not so free flowering as when planted against a wall (see fig. 23); it is quite hardy.

As a plant for forcing into flower under glass it has acquired considerable popularity. Propagation is usually effected by cuttings of firm wood, or sometimes by layering.

258. EXOCHORDA KOROLKOWII.

Award of Garden Merit, June 19, 1933.

Exochorda Korolkowii belongs to a small genus of choice shrubs and has been known to gardeners for more than half a century. It was first introduced to this country in 1881 under the name of *E. Korolkowii*, but it was not until five years later that it became at all widespread, and from then until recently it was known as *E. Albertii*; the name *E. Korolkowii*, however, is now to be used for it. Discovered at an

* Notes on plants which have received the Award of Garden Merit have been gathered together and published with the title *Some Good Garden Plants*. This can be obtained on application to the Secretary, R.H. Society, price 4s. Additional notes appeared in the JOURNAL R.H.S., vol. 68, pp. 190, 246, 448 and 546; 64, pp. 134, 232, 290, 374 and 484; 65, p. 60.

altitude of about 4,000 to 6,000 feet in Turkestan by ALBERT REGEL it has proved to be a hardy and thoroughly reliable garden plant of considerable charm.

The plant forms a deciduous shrub and reaches a height of about 15 feet when established. The flowers, which are pure white, about 1 to 1½ inch in diameter, are carried in erect racemes about 4 inches in length and a good plant presents a wealth of blossoms (fig. 24). The leaves, which appear very early in the spring, are obovate and smooth.

Its cultivation entails little difficulty provided the plant is placed in a sunny situation and the soil is composed mainly of good loam. Propagation is usually effected by means of seeds as it is not one of the easiest plants to root from cuttings. Pruning is usually confined to shortening the shoots slightly after the flowering, which takes place in May, a time when blossoms on shrubs are always appreciated to the full.

LATE CULINARY PEAS AT WISLEY, 1939.

TWENTY stocks of late culinary peas were received at Wisley for trial during 1939. These were sown on May 11, 1939; all grew and cropped well. They were finally judged by the Vegetable Panel on August 3, 1939, who made their recommendations for awards as given below. One variety, an unnamed seedling, from Messrs. Zwaan and de Wiljes was included and is not further referred to. Full details and descriptions of the varieties which did not receive awards are recorded at Wisley, and those interested may obtain this information upon request to the Director.

The following varieties were grown for comparison only, being representative commercial strains: AUTOCRAT, CONTINUITY, GLADSTONE, GLORY OF DEVON, INVICTA, LATE GEM, LATEST OF ALL, MATCHLESS, PERFECTION, PERPETUAL, ROYAL SALUTE.

SEEDS WRINKLED.

2 to 3 feet.

Comet (introduced and sent by Messrs. J. L. Clucas of Ormskirk, Lancs.). **H.C.** August 3, 1939.—Haulm 2½ feet, dark grey green; pods blunt, single pointed, almost straight, 4 to 4½ inches long, dark green; peas large, bright dark green, 7 or 9 in a pod. Crop good. Ready August 8.

Climax (raised and sent by Messrs. Zwaan and de Wiljes of Scheemda, Holland). **C.** August 3, 1939.—Haulm 2½ feet, medium yellowish-green; pods in pairs blunt, 4 to 5 inches long, slightly curved forward, medium green; peas large, medium bright green, 9 or 11 in a pod. Crop good. Ready August 8.

LUXOR (Watkins and Simpson), **JUBILEE** (Zwaan and de Wiljes).

3 to 4 feet.

Gilt Edge (raised and sent by Messrs. W. W. Johnson, Boston, Lincs.). **A.M.** August 3, 1939.—Haulm $3\frac{1}{2}$ feet, dark grey-green; pods in pairs, $4\frac{1}{2}$ inches long, pointed, somewhat curved, dark green; peas large, bright dark green, of good flavour, 9 or 11 in a pod. Crop very good. Ready August 3.

Splendour (raised and sent by Messrs. Zwaan and de Wiljes of Scheemda, Holland). **A.M.** August 3, 1939.—Haulm 4 feet, dark yellowish-green; pods in pairs, $4\frac{1}{2}$ inches long, blunt, straight, medium green; peas large, bright, dark green, 8 in a pod. Crop good. Ready August 11.

Steadfast (raised and sent by Messrs. Watkins and Simpson, Drury Lane, Covent Garden, W.C.). **A.M.** August 3, 1939.—Haulm $3\frac{1}{2}$ feet, dark grey-green; pods single, $4\frac{1}{2}$ inches long, blunt, straight, dark green; peas large, bright green, of good flavour, 8 in a pod. Crop very heavy. Ready August 10.

ARISTOCRAT (Nutting), **AUTOCRAT** (W. H. Simpson), **CHANCELOT** (W. H. Simpson), **GLADSTONE** (Morris, W. H. Simpson), **JOHNSON'S MAGNIFICENT** (Johnson), **LATE SELECTION** (Watkins and Simpson), **LIBERTY** (Sharpe).

Over 4 feet.

COLOSSUS (Johnson), **EMERALD** (Clucas), **MONSTER** (W. H. Simpson), **PRIZE-WINNER** (Laing and Mather).

BRUSSELS SPROUTS AT WISLEY, 1939.

FORTY-THREE stocks of Brussels Sprouts were received for trial at Wisley in 1939; all were sown on March 31, and transplanted in rows three feet apart each way, on June 19. All made good growth and cropped freely. The trial was judged by the Vegetable Panel, who made their recommendations for awards as given below.

The following varieties were grown for comparison only: **DWARF GEM**, **DWARF PERFECTION**, **FILLBASKET**, **ONE AND ALL**, **UNIVERSAL**.

DWARF VARIETIES (UNDER 2 FEET).

Extra Early Dwarf (sent by Messrs. W. H. Simpson, Monument Road, Birmingham). **A.M.** October 6, 1939, as an early variety for private use. Plant of compact habit, 18 inches; foliage of medium size, medium grey green, basin shaped; sprouts, very solid, roundish, 1 inch diameter, $1\frac{3}{10}$ inch long, tightly placed. Stood well. A good regular stock. Also sent by Messrs. L. Daehnfeldt, a less regular stock. (**A.M.** 1934.)

The following varieties were grown in the trial: **CLIMAX** (Yates), **COTSWOLD PIXIE** (J. Jefferies), **DWARF PERFECTION** (Winfield), **EARLY DWARF** (Ohlsens Enke), **EARLY MORN** (Zwaan and van der Molen).

TALLER VARIETIES (OVER 2 FEET).

Cambridge No. 5 (raised by the Horticultural Research Station, University of Cambridge, and sent by Messrs. Cooper, Tabor, Southwark Street, London, S.E.). A.M. November 16, 1939, as a variety for market and private use. Plant $2\frac{1}{2}$ feet; foliage somewhat incurved, light grey green; sprouts dark coloured, very solid, roundish, $1\frac{1}{2}$ -inch diameter, $1\frac{1}{2}$ inch long, evenly spaced. Stood well. A good even stock. Also sent by Messrs. W. H. Simpson, a less regular stock and by Mr. Morris, a mixed stock.

Early Market (raised and sent by Messrs. Harvey of Kidderminster). A.M. October 6, 1939, as a variety for market and private use. Plant $2\frac{1}{2}$ feet; foliage dark, dull, grey green; sprouts rather pale, solid, round, 2×2 inches, tightly placed. Stood well. A good regular stock.

Leader (introduced and sent by Messrs. S. Yates of Manchester). A.M. November 16, 1939, as a variety for market and private use. Plant $2\frac{1}{2}$ feet; foliage dark, grey green; sprouts rather pale, very solid, round, smooth, 2×2 inches, tightly placed. Stood a very long time. A true and even stock.

Early Selection (introduced and sent by Messrs. Harrison of Leicester). H.C. October 6, 1939, as a variety for market and private use. Plant $2\frac{1}{2}$ feet; foliage dark, dull, grey green; sprouts pale coloured, very solid, round, 2×2 inches, tightly placed. Stood well.

The following varieties were grown in the trial: ARISTON (van der Veld), BOSTON WONDER (Johnson), CLAUDS DAL WINTER (Ohlsens Enke), EARLY GIANT (Clucas), Evesham SPECIAL (Bunting, Watkins & Simpson), EXHIBITION (Winfield), FAVOURITE (Clucas), FOREX (Morris), HERALD (Sluis), IDEAL (Deal), LATEST AND BEST (Clucas), LATEX (Harrison of Leicester), LUBECK (Daehnfeldt), MASTERMAN (Finney), MASTERPIECE IMPROVED (Falconer), MATCHLESS (Laing & Mather), NEW GIANT (Brown), NEW KASTRUP (Daehnfeldt), ONE AND ALL (Daehnfeldt), ORMSKIRK GIANT (Clucas), PEERLESS (Nutting), PREMIER (W. H. Simpson), ROUS LENCH (Watkins & Simpson), SELECT HALF DWARF (Ferry-Morse), TIMPERLEY CHAMPION (S. Yates), TIMPERLEY GIANT (Bunting), UN-NAMED (Engelmann), WEARMOUTH (Finney).

SCARLET RUNNER BEANS AT WISLEY, 1939.

SEVENTEEN stocks of Scarlet Runner Beans were sent to Wisley for trial in the spring of 1939. These were sown in double rows on May 22, 1939, five feet separating each double row. All made good growth and fruited freely, but unfortunately the dry weather during August somewhat interfered with their growth. They were judged by the Vegetable Panel, who finally decided that no variety was sufficiently superior to strains at present in commerce. Full details and descriptions of the varieties are recorded at Wisley, and those interested may obtain this information upon request to the Director.

The crop weight given after each variety is that from one 12-foot double row.

The following varieties were grown for comparison only : AI, crop 45 lbs.; BEST OF ALL, crop 45 lbs.; DWARF GEM, crop 26 lbs.; PRIZEWINNER, crop 38 lbs.

SEEDS AND FLOWERS WHITE.

SUPERBA (Sluis Bros.), crop 34 lbs.; UNIVERSALIS (Piet van der Veld), crop 40 lbs.

SEEDS CREAMY-BUFF WITH BROWN STRIPES.

Premier (Johnson), (only twelve seeds sown).

SEEDS PURPLE WITH FEW BLACK MARKINGS ; FLOWERS SCARLET.

BUSH SCARLET (W. H. Simpson), crop 31 lbs.; COLOSSAL (Nutting), crop 44 lbs.; COOKHAM DEAN (Carters, Piet van der Veld), crops 39 and 36 lbs.; PRIZEWINNER IMPROVED (Morris), crop 39 lbs.

SEEDS PURPLE WITH BLACK MARKINGS ; FLOWERS SCARLET.

BADSEY WONDER (Speed), crop 34 lbs.; DWARF SELECTION No. 1 (W. H. Simpson), crop 45 lbs.; KELVEDON WONDER (Deal), crop 54 lbs.; PEERLESS (Nutting), crop 30 lbs.; PENNELL'S IMPROVED STRAIN (Pennell), crop 52 lbs.; SCARLET EMPEROR IMPROVED (Morris), crop 39 lbs.; STREAMLINE (Carters, Morris), crops 44 and 45 lbs.

BOOK REVIEWS.

"A Book of Roses." By J. Ramsbottom. Small 8vo. 30 pp. + 16 coloured plates after the originals in Redouté's "Roses." (Penguin Books, Ltd., Harmondsworth, Middlesex, 1939.) Price 1s.

History has been made by this attractive little volume, for certainly its like has not appeared before if intrinsic value be considered, nor has the subject been treated in similar fashion before. The text by Mr. Ramsbottom is in two parts; the first historical and the second descriptive of the sixteen plates which are bound together at the end of the book. In the historical section the author deals first with the life and achievements of P.-J. Redouté, "*le Raphael des fleurs*," and then traces references in literature to the Rose and its gradual rise to its present proud position. Brief notes upon early work on Roses and upon the origin of modern types conclude this part of the book. The descriptions of the varieties illustrated are succinct and informative; indeed it is a tribute to the author that he has condensed into thirty small pages such a wealth of data. The illustrations themselves are surprisingly good reproductions of a selection from the superb plates of "*Les Roses*" and none but the hypercritical would find fault with them when the purchase price of the book is kept in mind. If any criticism is admissible of this little volume, an excellent idea and well carried out, it is levelled against its title. It tends to be at once slightly misleading and wholly inadequate to convey a true description of the contents. One feels that the title was the inspiration of the publisher and not of the author.

"Plants with Personality." By Patrick M. Syng. 8vo. 244 pp. Ill. (Lindsay Drummond, Ltd., London, 1939.) 12s. 6d.

Since his death, and even before, many horticultural writers have aped the writings, the enthusiasms and the verbal extravagances of Reginald Farrer. With the flattery of imitating his enthusiasm there can be no quarrel. Enthusiasm surely is to the good, and if it be well directed it is beyond price, even though at the

present time it may be at a discount. To imitate the Farrerian style of writing is another matter ; there are many who have grown a little weary of it and who in their satiety have observed that the imitators have achieved about as much success as those who would write as Shakespeare wrote or would, in modern times, try to equal the language of the Bible. Let us not say a thing to belittle Farrer and his works, but, above all, let us spare him the doubtful compliment of imitating him. Mr. Synge's book leaves the reader with an uncomfortable feeling that he has tried to work out his love of the strange, exotic (in the popular, and not the accepted botanical sense) and often beautiful plants on the lines that Farrer *might* have followed, had his tastes lain that way, with mixed results. Mr. Synge follows Farrer faithfully, even to the coining and unorthodox use of adjectives and his nostalgia for high places. The book treats in a discursive manner many that are fine garden plants and many that are just botanical oddities, and to each the author accredits "personality." There is little new between its covers, but much that has been "from the dust of old oblivion raked." The author carries the reader upon waves of enthusiasm from water plants to the plants that entrap and destroy their living prey, from the giant Lobelias of Africa to Conifers and bulbous Irises, and groups the plants in a geographical arrangement which was probably the only way to classify such a widely differing selection of plants. The illustrations by John Nash are, of course, superb, but the reproductions of plates from the *Temple of Flora* and that of *Magnolia Campbellii* from Hooker and Cathcart's "Illustrations of Himalayan Plants," while embellishing the book, convey little of the splendour of the originals. As a gift book it will appeal to many.

"Gardens and Gardening, 1940." Ed. by F. A. Mercer and C. G. Holme. 4to. 128 pp. Ill. (Studio, London, 1940.) 10s. 6d.

For thoughtful design and tasteful production, The Studio's annual gardening publication holds a high place among horticultural literature. This year's issue, in spite of the war, improves upon a good record. Lavishly illustrated articles describe gardens in Spain, Italy and America, while new plants and gardening in war-time are also discussed. The Editors have done their work well.

"A Garden goes to War." By Stephen Cheveley. 104 pp. (John Miles Ltd., 1940.) 2s. 6d.

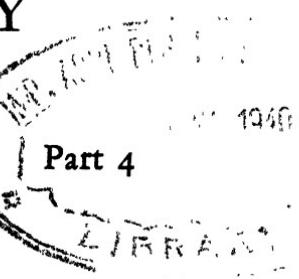
Those who have followed Mr. Cheveley's conversion to amateur gardening in his previous book, "Out of a Wilderness," will be interested to read how he changed his garden to a war-time footing. Mr. Cheveley enters the spirit of the "Grow More Food" campaign with zest and determination, and the reader is left with the conviction that no sacrifice is too great if the garden can be made to produce even one more Onion or one more row of Carrots. This sound little book, after explaining the transition from flower growing to vegetable growing, deals with soil and its cultivation, and many details in the culture of vegetables and fruits, their diseases and pests, and the best methods of storing the produce.

"News of Persephone." By Dorothy Una Ratcliffe. 8vo. x + 224 pp. Ill. (Eyre & Spottiswoode, Ltd., London, 1939) 12s. 6d.

This book is an account of a pilgrimage among the villages, temples and flowers of Greece. The temples predominate, but here and there are intimate descriptions of many Greek wild flowers which reveal considerable botanical knowledge and enthusiasm on the part of the author. The illustrations of town and country scenes and picturesque inhabitants are superb.

JOURNAL OF THE ROYAL HORTICULTURAL SOCIETY

Vol. LXV



April 1940

THE SECRETARY'S PAGE.

THERE was a very pleasant gathering on the occasion of the Annual Meeting on February 20 to hear the report of the President on the year's work (particulars of the proceedings will be found on pp. xxiv-xxxiv). The Fortnightly Show held on this occasion was attractive and there were many beautiful exhibits. Its success was not only a sure sign of the approach of spring, but also of the maintenance of interest in our gardens.

During the year a number of competitive classes, principally for amateurs, have been arranged for the Fortnightly Meetings. The dates of these competitions were given in the calendar in the January JOURNAL, and full details are now published in the pamphlet giving the regulations for the Society's exhibitions, a copy of which can be had on application.

On April 16 (12 noon to 6 P.M.) and 17 (10 A.M. to 5 P.M.) there will be a Fortnightly Show and also the annual Daffodil Show. The annual Daffodil Show has always been one of the major attractions of the Society's activities, and it is hoped that the comprehensive schedule, drawn up prior to the outbreak of hostilities, will again induce a large number of exhibitors and competitors in spite of the prevailing difficulties. The schedules are available on application, and the entries close on April 13.

In the afternoon of the first day Professor WEISS will give his second Masters Memorial Lecture on "Graft Hybrids and Chimaeras," the first having been given on April 2.

On the second day, provided his duties will allow it, Major C. B. HABERSHON will give a short talk on "Some Plants in the Show" at 3 o'clock.

A Fortnightly Show will be held on April 30 (12 noon to 6 P.M.) and May 1 (10 A.M. to 5 P.M.) at which the Rhododendron Association and the National Auricula and Primula Society will co-operate. On this occasion the Society's competitive classes for Flowering Trees and Shrubs will be held as follows :

Class A.—8 varieties of trees and/or shrubs in bloom, grown in the open air, 1 vase of each. Rhododendrons and Azaleas excluded.

First prize, £4 ; Second, £2 ; Third, £1.

Class B.—4 varieties of trees and/or shrubs in bloom, grown in the open air, 1 vase of each. Rhododendrons and Azaleas excluded.

First prize, £3 ; Second, £1 10s. ; Third, 15s.

A competitor may enter in Class A or Class B, but not both.

Class C.—1 vase of a tree or shrub in bloom, grown in the open air. Rhododendrons and Azaleas excluded.

First prize, £1 ; Second, 15s. ; Third, 10s.

A competitor may not exhibit in Class C any plant which he is exhibiting in Class A or Class B.

Class D.—1 vase, pot or tub of a tree or shrub in bloom, species not introduced before 1920. Rhododendrons and Azaleas excluded.

First prize, £1 ; Second, 15s. ; Third, 10s.

Particulars will be forwarded on application.

In addition to these competitions the two Societies, mentioned above, will be arranging competitions ; particulars of those of the Rhododendron Association may be obtained from Mr. GURNEY WILSON, c/o R.H.S. Offices, Vincent Square, London, S.W. 1, and of those of the Auricula Society from Mr. G. H. DALRYMPLE, The Nurseries, Bartley, Southampton.

On April 30 at 3 P.M. Mr. COBB will lecture on "Sowing and Planting the Vegetable Garden in Summer and Autumn" ; and the talk on "Some Plants in the Show" will be given by Mr. J. COMBER on May 1 at 3 P.M.

A Fortnightly Show will be held on May 21 (12 noon to 6 P.M.) and 22 (10 A.M. to 5 P.M.), and on this occasion Sewell Medal Competitions will be held for Alpine and Rock-garden Plants. Two medals are available, one for an amateur's exhibit and one for a horticultural trader's exhibit, and full particulars are available on application to the Secretary.

At 3 P.M. on May 21 Mr. G. FOX WILSON will lecture on "Some Seasonal Pests of Garden Vegetables and their Control" ; and at 3 P.M. on May 22 Mr. C. P. RAFFILL will talk on "Some Plants in the Show."

THE LILY GROUP.

In the evening of April 30, the first of the Lily Group meetings will be held in the Restaurant of the Old Hall at 4 P.M., when a discussion on "Plants to Associate with Lilies" will take place. Notices to all registered members of the Lily Group have been sent out, but particu-

lars can always be obtained on application, and Fellows who are not members of the Group are invited to attend.

PRACTICAL DEMONSTRATION AT WISLEY.

The practical demonstrations this year are really perhaps of more importance than before, and on April 17 and 18, from 2 P.M. to 4 P.M., there will be a demonstration, weather permitting, on the Control of Vegetable Pests and Diseases. In order that the arrangements may be made, those Fellows desiring to attend the demonstration should notify the Director of the Gardens beforehand.

EXAMINATIONS.

The practical portion of the examination for the British Floral Art Diploma will be held in London in the Old Hall on April 25 and 26, and in the afternoon of the second day the exhibits of the candidates will be on view and the Fellows and their friends are invited to see the work done. The written examination for the National Diploma of Horticulture will take place on April 27, and the practical portion of this examination, which is held at Wisley, has been arranged to take place in the month of June. Particulars will be forwarded to the candidates.

PANEL OF LECTURERS.

The Panel of Lecturers has been steadily growing and a large number of lectures has been asked for and given. Affiliated Societies are particularly requested to send in their applications for lecturers as early as possible or ask for the rules regarding obtaining a lecturer. Undoubtedly, with the approach of spring, the desirability of arranging demonstrations in small gardens or allotments will be felt, and demonstrators can also be supplied from the Panel of Lecturers. It is most essential that Affiliated Societies should do their best to urge their members to encourage the growing of more food in accordance with the policy that has been laid down by the Government.

WISLEY TRIALS.

The Trials that are held annually at Wisley are of great importance and have always proved one of the attractions of a visit to Wisley. The dates on which the Vegetable Trials may be inspected have been given on the tickets, but it is thought that the following programme of Trials would be of interest and would be a reminder of the importance and the scale on which these Trials are carried out.

Flowers—standard collections.

Joint-Committee Trials of Yearly Selected Varieties :

New Border Carnations.

New Chrysanthemums (Early flowering).

New Dahlias.

New Delphiniums.

New Irises.

New Narcissi.

New Rhododendrons and Azaleas.

Flowers—other than the standard collections:

Cytisus and Genista hybrids.
 Poppies, Iceland.
 Poppies, Shirley.
 Stocks, 'Winter Brompton' and East Lothian.
 Sweet Williams.

Vegetables.

Cabbage Lettuces (summer varieties).
 Carrots (outdoor varieties).
 Cauliflowers.
 Onions (spring sown).
 Kales (demonstration trial).
 Haricot Beans.

THE MIDLAND DAFFODIL SOCIETY'S SHOW.

The Midland Daffodil Society will hold its annual Show at the Edgbaston Botanical Gardens, Birmingham, on Wednesday and Thursday, April 24 and 25. Schedules may be had from the Hon. Secretary, Mr. W. J. Bevis, 20, Tenby Street North, Birmingham. The Joint Committee of the Royal Horticultural Society and the Midland Daffodil Society will meet at the Show on April 24 to consider varieties submitted for certificate.

WISLEY IN APRIL.

ALTHOUGH signs of the havoc wrought by the winter frosts will probably be very evident among woody plants, especially evergreens, and indicated too by those which have had to be severely pruned to aid recovery, yet the increasing warmth and sunshine of spring will help the young growth and foliage to hide these wounds, while others, unhurt, will be pushing forth buds and flowers as usual.

On the rock garden, small bulbous plants will be in evidence—*Narcissus Bulbocodium* and *N. nanus*, *Chionodoxas*, etc.—early species of Primula like *P. rosea*, *P. Sieboldii*, and *P. chionantha*, the bright blue *Pulmonaria angustifolia* in several forms, the double Kingcup, *Caltha palustris* var. *plena*, by the pool-side, and among a number of suitable shrubs *Daphne Blagayana* and *D. tangutica*, *Osmanthus Delavayi*, the hybrid *Cytisus kewensis*, so profuse with its creamy flowers, and a large assortment of the dwarf species of Rhododendron which flourish with an annual dressing of leaf-mould on the cooler northern slope. They include the pink *R. racemosum*, *R. scintillans*, *R. intricatum*, *R. impeditum*, and the prostrate, purple-flowered *R. chameunum* of the 'Saluenense' series.

The unheated Alpine house surpasses the array of spring flowers out of doors, and with the added protection of a roof over their heads its occupants are able to develop their flowers unspoiled by cold or wet conditions. We can only mention a few of those most outstanding ; they include many species of *Saxifraga*, including *S. Arco-Valleyi*, *S. Grisebachii*, the clear yellow hybrid *S. Boydii*, and pink *S. Stribrnyi* ; of *Primulas*—*P. Allionii*, *P. marginata*, *P. redolens*, and the hybrids 'Faldonside' and the old but most valuable blue-purple 'Mrs. J. H. Wilson.' Species of *Androsace*, the rich blue *Lithospermum prostratum* var. *erectum*, tufted pale pink *Armeria caespitosa*, the lovely *Shortia uniflora* var. *grandiflora*, and several sorts of *Fritillaria* are among them, with numerous others.

In the beds or frames adjoining the Alpine house some uncommon bulbs will be flowering, including *Fritillaria glauco-viridis* and *F. crassifolia*, various species of *Muscari*, the Grape-Hyacinths, of *Tulipa*, including the reddish or copper-coloured *T. Orphanidea* and *T. Hageri*; likewise *Iris Sari* from Turkey, with peculiarly coloured flowers of greenish-white overlaid with veins of brown or grey. There, too, are the collections of *Aubrietia* and forms of the dwarf *Iris Chamaeiris* in the nursery on the west side of the Alpine house, making it easy for visitors to compare the different varieties under identical conditions.

Passing down into the Wild Garden, the absence of the *Camellia* flowers will be noticeable, the buds having been destroyed by the exceptionally severe frosts of January ; the same may also apply to some of the species and hybrids of *Rhododendrons*. The planting of *Primula denticulata* on the ditch-side nearest to Seven Acres now opens its purple heads, which, together with the white tassels of the *Pieris* shrubs, the gay yellow patches of *Narcissus cyclamineus* in the earlier part of the month, and the pink or white flowers of the low-growing, evergreen *Shortias* from America or Japan, should do much to brighten this part of the Gardens.

The Heath Garden in Seven Acres will, unfortunately, not be up to its usual standard, the frosts having caused much destruction among the taller species—*Erica mediterranea* var. *superba*, *E. lusitanica* and *E. australis* being all severely damaged by stem-splitting. In April, however, some of the forms of *E. carnea* such as *Vivellii* and 'Springwood White' have not concluded their season and will still be full of colour, as well as their taller hybrid relative *E. darleyensis*. Here, too, some of the most precocious Brooms will be found in bloom towards the end of this month—*Cytisus praecox*, the white *C. multiflorus*, and *Genista falcata*, if the weather has not proved too much for its constitution.

Most of the deciduous shrubs which do so much to beautify Seven Acres at this season of the year will be as ornamental as usual ; these include the varieties of *Chaenomeles (Cydonia) lagenaria* and *C. japonica*, the Japanese and Chinese Quinces with their scarlet, pink or white blooms, the species of *Pyrus*, of which *P. ussuriensis* is the most effective at Wisley, *Prunus incisa*, *P. Sargentii* and *P. yedoensis*, all invaluable

for most gardens of moderate size, *Magnolia Kobus* with pure white flowers on leafless branches, the earliest Crab Apples, *Malus hupehensis* var. *rosea* and the beautiful hybrid *M. purpurea*, and several sorts of Spiraeas, of which *S. arguta* is the finest in bloom, together with their relatives the Exochordas, or Pearl Bushes. Among these shrubs the Daffodil trials are planted and add very considerably to the total effect, as well as by their extended flowering period.

In the Award of Merit Garden are fine examples of *Magnolia Soulangeana*, *Malus floribunda* and *M. Eleyi*, the fragrant double-flowered Gorse, and *Berberis stenophylla*, all of which are admirable shrubs or small trees and on a fine April day make a delightful picture in this setting.

The greenhouses have, of course, many plants of varied interest to show. In the large Temperate house Rhododendrons include *R. ciliocalyx* and *R. Johnstoneanum* of the 'Maddenii' series, and the prostrate, tender vermillion *R. Oldhamii* planted in the border, the scented, yellow-spiked *Cytisus racemosus* var. *elegans* which, regrettably, is not hardy outside, *Begonia fuchsioides*, a free-flowering pink species, *Clivia miniata*, of glowing red hue, and the climbing Hibbertia species, *H. volubilis* and *H. dentata*, both with yellow flowers. *Fuchsia corymbiflora*, a tall plant with clusters of tubular scarlet flowers, also blooms this month.

In the second house Cinerarias, Primulas, and Pelargoniums are likely to be on view. Of those plants growing in the Half-hardy house the mauve *Prostanthera Sieberi* and *P. rotundifolia*, natives of Australia, the small bushy *Acacia pulchella*, the almost perpetual *Gerbera Jamesonii* with rose or buff flowers, two decorative *Sedum* species, *S. praealtum* and *S. Palmeri*, both having yellow flowers, the delightful pale lavender-coloured *Calceolaria violacea*, and a South African bulb, *Babiana disticha*, with Tyrian purple flowers of the size and shape of a Freesia, are most notable.

THE KITCHEN GARDEN IN APRIL.

TOWARDS the middle of the month, with the advent of better weather, sowings of Broccoli, Kales and Savoys should be made, not forgetting a row of the useful and much-neglected Red or Pickling Cabbage. Small successional sowings of Carrots and Beet may also be made during the month, and Lettuces, Radishes and other salad crops, together with the round-seeded Spinach, should be sown at fortnightly intervals to provide a continuous succession of young, fresh produce. More Turnips also may be sown at intervals in small quantities, and it is worth while, except in very bleak, cold districts, to sow the first batch of French Beans on a warm border at the end of the month. A row of Pickling Onions of the well-known variety Silverskin may also be sown now.

If there is a piece of ground to spare, it is a good practice to sow a small quantity of Leeks very thinly and to leave them *in situ* in order that an early crop of short, tender Leeks may be obtained. For larger specimens the familiar method of sowing and transplanting should, of course, be carried out. The main crop of Potatos should be planted during the month, and in districts where wart disease is known to exist care must be taken to plant only immune varieties. Celery seedlings should be pricked off into frames or boxes as soon as they are large enough to handle, as delay in carrying out this operation will result in poor, unsatisfactory plants. Plants from early sowings of Brussels Sprouts, Cabbages and Cauliflowers should now be pricked out, and Onions raised in frames or boxes should be planted out on well-prepared ground.

General garden operations will include the timely thinning of crops, a vigilant watch for the appearance of weeds and their removal before they become large and troublesome. Should the weather be favourable, every opportunity should be taken to hoe between rows of established crops, and it is wise also to furnish rows of Peas with stakes early in the season as this not only offers some protection to the young plants, but avoids the damaging consequences of inserting sticks in ground which has become dry, thereby still further reducing the moisture available to the young plants. With the idea of conserving moisture, too, a mulch should be applied to the rows of Peas before the ground dries up. All old stems of Brassica crops which are now finished should be removed; the ground they have occupied will be excellent for planting out Leeks. Runner Beans, contrary to a belief still held by some people, repay in full measure for generous treatment in the matter of trenching and manuring. The site for Runner Beans should be dealt with by digging out a trench 2 feet wide and 2 feet deep; the bottom of the trench should be broken up and left rough; well-rotted manure and soil should be placed on top of this until the trench is filled up, leaving, of course,

about 4 inches of soil as the top layer in which to plant or sow the Beans. This work should be done during the present month in order that all should be ready for sowing later when the danger of frost is passed. April is the best month to sow Asparagus seeds and also to plant out young crowns on well-prepared ground if new plantations are to be made.

Tomatos in greenhouses require careful attention at this period of the year. Side shoots should be pinched out and flowers pollinated by hand every day. Care must be taken to see that no moisture is allowed to settle on the fruits, and steps must be taken to prevent damage by White Fly should this pest put in an appearance. As Cucumbers reach their allotted height in the house they should be stopped and all side growths pinched back to the first or second leaf as space permits. Keep the plants well supplied with water, and add soil to the surface of the beds to prevent the roots from becoming exposed.

To prevent Black Currant bushes becoming infected with Big Bud Mite, spray with lime-sulphur at 1 in 30, when the first of the unfolding leaves have reached the size of a shilling; a suitable spreader should be added to the wash. Where American Gooseberry Mildew is prevalent spray the bushes with a wash consisting of 1½ lbs. washing soda, and 1 lb. soft soap, dissolved in ten gallons of water; apply the first spray just before flowering, and repeat, after flowering, at fortnightly intervals. To control Pear Scab, spray the trees, just as the buds are beginning to burst, with lime-sulphur at 1 in 40; repeat this spraying at 1 in 60 just before the flower buds begin to open. The control for Apple Scab is the same, and the lime-sulphur wash is applied at the stages mentioned; the varieties 'Stirling Castle,' 'St. Cecilia,' 'Lane's Prince Albert' and 'Newton Wonder' are damaged by lime-sulphur, and these varieties should be sprayed with Bordeaux mixture. A Plum tree which flowers but fails to set fruits should have flowers of some other variety suspended in a jar among its branches, so that bees and other insects will transfer pollen from one variety to the other, thus bringing about cross pollination.

Give established Strawberry beds a good mulch of well-decayed farmyard manure to provide a little extra food for the plants and to conserve soil moisture.

Provide all trees growing against walls or fences with a good mulch of farmyard manure, and with the advent of dry weather give such trees copious supplies of water. In gardens where it is intended to graft fruit trees at the end of the month see that such materials as grafting wax, etc., are in readiness for the operation.

In the viney maintain a more buoyant atmosphere during the flowering period by opening the side ventilators during sunny periods, to assist the free transfer of pollen. Gently shake the rods and lightly dust the flowers with a rabbit's tail. In the Peach house continue to thin out fruits and disbud surplus growths, retaining those which are best placed.

FEATURES OF MY GARDEN.—II.

THE HOME WOOD AT EXBURY

By LIONEL DE ROTHSCHILD, O.B.E., V.M.H.

IT is sometimes the habit in Cornwall to decry trade Rhododendrons and make out that only species and their own hybrids are worth growing.

Fourteen days after the Armistice in 1918 four men began trenching the Home Wood and, as I had not begun to raise seedlings, I had to plant it with Rhododendrons and Azaleas that I acquired from Nursery Gardens and a year or two later from Leonardslee, and to this day most of its beauty comes from those plants. It is true that many of these have been discarded, but then I wanted as many as possible on their own roots. These were mostly the older varieties, now labelled Y or Z in the Rhododendron Association's Year Book. If a would-be purchaser were to follow their classification and order only those plants which have more than one star against their names, he would not require to weed out as I have done. Many of the starred varieties are growing at Exbury but are not mentioned in this article for lack of room.

The wood, consisting mostly of Oak and Scotch Fir, runs south-west from the house down to the Beaulieu River and, with its open glades, its ponds and its little streamlet, is ideally situated for growing Rhododendrons.

The top of the wood is an open glade running almost due west, and here I have colour for six months of the year.

A bank of Rhododendron 'Christmas Cheer' usually begins to open its little pink flowers early in January, and I have had it in flower for three months, with an occasional interruption due to Jack Frost.

Behind these is a group of 'Ascot Brilliant'—still one of the best red Rhododendrons for a good splash of colour in April.

As one walks down the glade on the south side some pink *R. arboreum* forms the background with *R. Bodartianum* which always covers itself with its white flowers in April. In front is a large plant of 'Helen Schiffner'—the purest white of all the garden hybrids, but which must be grown in the shade, as in sun it always seems to get the Rhododendron Fly. There is also a fine plant of 'Gill's Crimson,' magnificent at the end of March. Then comes a bank of 'Mrs. P. D. Williams,' a plant I am very fond of, as its browny yellow eye and white flowers make a striking picture when it is in full bloom.

Three or four large 'Lady E. Cathcart' give a little height with, in front, some 'Britannia,' a Rhododendron which has very good points, but which I still often think I shall discard as its red is not pure. Two plants of 'Mrs. G. W. Leak' make a pretty picture in flower.

They are now nearly twenty years old and never fail to display their beauty.

Rhododendron Loderi—the Knap Hill *campanulatum* form—and *R. campylocarpum* make a perfect picture, and right at the end the original plant of 'J. G. Millais' is a wonderful sight at the end of April or early in May when covered with its large scarlet flowers. It is, I think, the best of the Rhododendrons that have come from Bagshot.

Returning along the north side where the plants get more sun a hardier race has had to be planted. Where they are shaded by trees some 'Purple Splendour' display their sombre beauty in late spring, and *Azaleodendron 'Galopper Light'* with its pinky yellow flowers makes a pleasing contrast. A bed of hardy hybrids follows with 'Lady Clementine Mitford,' 'Mrs. George Paul,' and 'Mrs. J. C. Williams'—a fine white Rhododendron—and many others. In front is the 'Earl of Athlone,' the purest red of all the Dutch hybrids but none too hardy.

Then comes a big bank of 'Doncaster,' always a good splash of colour, and 'Sweet Simplicity,' a charming Bagshot hybrid which does justice to its name with its delicate blush flowers edged with pink. In front are some of the newer hybrids—'Pygmalion,' 'Princess Elizabeth,' and 'Mother of Pearl,' a sport from 'Pink Pearl,' and to my mind much more beautiful. One day I hope it will take the place of the large group of 'Pink Pearl' behind it.

I was standing there one day talking to a friend of my wife's who was supposed to be a great gardener, and with whom, on my wife's special instructions, I had spent all the afternoon showing my treasures. It was in May and there was a wealth of colour in the garden. *R. Loderi* was at its best and, rather exhausted, I suggested that we should return for a cup of tea. She agreed, but said, after thanking me for showing her round, "Mr. ROTHSCHILD, there is one Rhododendron which you have not got in your garden and I am rather surprised. You have never shown me 'Pink Pearl.' " I pointed to the group behind me, but after looking at it she answered, "Oh no, Mr. ROTHSCHILD, you have not got the right thing—'Pink Pearl' is much more beautiful than that." Comparisons are odious; but where *R. Loderi* will not grow 'Pink Pearl' will, and so, of course, should 'Mother of Pearl,' which when it is as well known will, I am sure, take its place.

But enough of the glade; let us walk down the wood. Facing the lawn is a group of 'B. de Bruin'—still the finest red of all the late hardy Rhododendrons, and as we turn down into the wood one of the original specimens of *R. auriculatum* has begun to overgrow the path. It is always in full beauty in Cowes week, and many a yachtsman has stopped to admire it. A little further on is the original 'Bagshot Ruby,' the colour of a fine Burmese ruby, but it is best by itself with a green background.

By the other side of the path is a double row of 'Ivery's Scarlet' with *Azalea ledifolium* in between, but alas, they never flower together. A winding footway goes between and this vista of a hundred yards is a goodly sight when one or the other is in flower.

Along the path, however, are some of SLOCOCK's *campylocarpum* hybrids whose soft yellows mingle perfectly with the red of 'Ivery's Scarlet.'

Under the fir trees on the east side are some large *R. calophytum*—surely the noblest of WILSON's introductions—its large white flowers and maroon blotch sitting so firmly between the large green leaves at the end of March. Here also is the "Angustini*ii* walk" which has often provided the background to my groups at the Rhododendron Show. A little further is a group of *R. mucronulatum* which is usually in full beauty on the 1st January—this year I had a fleeting glimpse of what was to come just before Christmas, but whether any buds have escaped the present frost I do not know.

A little further to the west a group of different forms of *R. sutchuenense* and *R. praevernum* open their flowers between January and March.

I think of all I like var. *Geraldii* the best, though one seedling of *R. praevernum* is especially fine.

I know botanists say that *Geraldii* is only a natural hybrid between the two species, but from the garden point of view there should be only one *Geraldii*—the fine form which originated at Wakehurst and has lavender flowers with a deep purple blotch.

A mass of *R. praecox* in front of some *Hamamelis mollis* usually open their purple buds before the glory of the latter has quite disappeared. And now we leave the Rhododendrons for the time and enter the realm of Azaleas. The woodland is more open. Here I must confess a great many of my own hybrids have taken the place of some of those originally planted, but there is still a big drift of *A. coccinea speciosa* and 'Gloria Mundi,' both identical in their orange beauty, but one flowering a week later than the other. A large bed of ANTHONY WATERER's hybrids by the pond has provided the parents of most of my own crosses. A group of the scarlet 'H. H. Hunnewell' also makes a fine picture every year, and a little lower down all the *occidentale* hybrids, which are perhaps the most beautiful and sweetly scented of all Azaleas.

Some of the *japonicum* hybrids also remain—'Clara Butt,' 'Floradora,' now grown into big plants, and 'J. C. Van Tol' and KOSTER'S 'Brilliant Red' in mixture.

As we proceed further down the woodland the tidal river begins to make its influence felt, and with slightly warmer conditions a large group of *R. Falconeri* and other big-leaved Rhododendrons flourish—in front of them is a drift of *Azalea 'Hinomayo'*, the hardiest and best pink of all the "Kurume" section. On the other side of the path is a group of 'Glory of Littleworth' which nearly always takes the prize for the best Azaleodendron, and a little further down a large plant of 'Beauty of Littleworth,' I think the best of all the hardy white Griffithianum hybrids. A little straggly when young, the plant at Exbury—a gift from Kew—is now 15 feet high and perfect in shape and foliage. Behind the big-leaved Rhododendrons facing another path is a bed of 'Mrs. Lionel de Rothschild,' a pretty hybrid from Knap Hill, and further down some large *R. Shilsoni* from Leonardslee which

are a glowing mass of scarlet in early March. In front of these some form of *R. Kaempferi*, 'Mikado' and 'Daimio' give a touch of dull orange in the summer.

Azalea stricta glauca always attracts attention for its odour in the lower wood, and so does *viscosa* when it opens its sticky flowers in July.

A drift of 'Queen Wilhelmina' opens its flowers usually in March, but I have cut it in May. Perfectly hardy, it is one of the parents of 'Britannia' and, where it can be flowered, a superb Rhododendron. A large edging of various Kurume hybrids here give a lovely picture in early May.

In various parts of the wood *Rhododendron lutescens* opens its yellow flowers from February till April. Often frozen they give me lots of pleasure, and their cheerful green foliage and young bronzy shoots are always a delight to look at.

Here also is a large group of *R. yunnanense*, one of the best of the triflorum section—hardy, late, and free flowering, in its finest form, superb. And now we go over the little stream and wend our way back again up the woodland past large specimens of 'Loder's White,' a magnificent plant in semi-shade—past the Azaleas to a dell where 'St. Mary's Spring' comes out of the earth, where groups of mauves and pinks predominate—all the old favourites, all if you like false colours, but all blending beautifully together as there is nothing to clash.

After all the real art of gardening is not only to group plants to make a picture but also to see that colours mingle well. What has been done in herbaceous borders can just as well be done on a large scale in the woodland with Azaleas and Rhododendrons. Time and again one goes wrong—a plant flowers too soon or too late, but luckily Rhododendrons and Azaleas like to take a walk and I have even moved them in flower with perfect success, only of course they wanted careful watering afterwards. Too many of the Rhododendron gardens of to-day have been planted with no eye to colour. Seedlings are planted out and left to grow.

In the Rhododendron wood the axe should be frequently used if a plant is too large to move and is obviously not in the right place. Generally speaking, Azaleas and Rhododendrons do not mix well together, but Azaleas look very well against the dark green of Rhododendrons which have flowered earlier in the year.

Rhododendron Kaempferi itself does not look well with any other Azalea or Rhododendron in flower. At Exbury on the north side of the Home Wood there is a little glade where it flourishes alone with some *Prunus Pissartii* as a background and a few *R. discolor* at the side, which do not flower until July, long after *R. Kaempferi* is over.

And with *R. discolor*—almost the best of WILSON's introductions and which ought to be in every English garden (it does not flourish, alas, in Scotland)—I will say good-bye to the Rhododendrons at Exbury I enjoy so much and which anyone can purchase from one or other of the numerous nurserymen who specialize in Rhododendrons.

PATRONS, COUNCIL AND OFFICERS, 1940

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SIR ARTHUR W. HILL, K.C.M.G., M.A., Sc.D., F.R.S., F.L.S., V.M.H.

EDITOR AND KEEPER OF THE LIBRARY

SIR DANIEL HALL, K.C.B., LL.D., D.Sc., F.R.S., V.M.H.

DIRECTOR OF WISLEY GARDENS

R. L. HARROW, V.M.H.

SECRETARY

F. R. DURHAM, C.B.E., M.C.

ASSISTANT SECRETARY

A. SIMMONDS

EXTRACTS FROM THE PROCEEDINGS
OF THE
ROYAL HORTICULTURAL SOCIETY.

ANNUAL GENERAL MEETING.

FEBRUARY 20, 1940.

REPORT of PROCEEDINGS at the ONE HUNDRED AND THIRTY-SIXTH ANNUAL GENERAL MEETING, held on Tuesday, February 20, 1940, in the Lecture Room, New Hall, Greycoat Street, Westminster, London, S.W. 1.

The Lord ABERCONWAY, C.B.E., V.M.H., President, in the Chair, with Members of Council and about two hundred Fellows.

The SECRETARY read the notice convening the Meeting. The Secretary announced that the Minutes of the previous Annual Meeting held on February 21, 1939, had been circulated in the JOURNAL, Vol. 64, Part 4, April, 1939.

The PRESIDENT : I beg to move that the Minutes be taken as read, and that they be adopted.

The motion was agreed and the Minutes were signed by the Chairman.

The CHAIRMAN : I now rise to move

THAT the Report of the Council be adopted.

I rise with a deep sense, which is common I know to you all here, that the disaster of the War overshadows all minor matters, but we must recognize at the same time as practical people that when we have done our utmost for the national effort, it is both our right and our duty to turn to other things ; especially is it our duty to try and preserve for the peace to come the amenities which we have enjoyed during the peace that has gone. I make, therefore, no apology for saying here to you that in my opinion the gardens and the nurseries that serve the gardens should not be allowed to go derelict in this crisis. You repair your roofs and mend your burst water-pipes, why not keep your gardens going ? The upkeep, of course, is bound to be far

less thorough ; the ephemeral features, the bedding out, the annuals, to a very large extent, must disappear ; indoors in greenhouses the large batches of flowering plants that used to be grown will either be replaced by vegetables or fruit, or they will be grown only in very small quantities, and of them only the plants not easily replaceable.

We must make an effort, too, to help the horticultural trade in the very bad times which it must necessarily go through, and I would suggest this : all gardens need each year plants for replacing those that are dead, and this year, after the disastrous winter we have had, the need for such replacements will be very evident in many gardens. It adds practically nothing to the upkeep of gardens to replace the plants that have vanished, and I suggest you should order such replacement plants, and not grudge at any rate that measure of support to the Nursery trade.

If it is important to keep our gardens alive, it is equally important in my view that we should maintain the activities of our Society. During the international unrest last spring and summer our Society did not increase its Fellowship, but at any rate it held its own. Since the War, as in the last War, the Fellowship has decreased, but we hope that, partly owing to gratitude for the past efforts of the Society, partly owing to a lively sense of favours to come, the desertions from our Society may be reduced to a minimum. Of course the pressure of war work will prevent many of the Fellows attending the Fortnightly Meetings as often as they may wish. Chelsea for the moment is no more, and that no doubt will influence many Fellows, but I would ask them to remember and be cheered by the reflection of how minute is the subscription compared to the huge cheques they draw in favour of the Commissioners of Inland Revenue.

Now I must make some reference to the Society's activities, and like Caesar's Gaul they are usually divided into three parts : there are our Shows, our publications, and there is Wisley.

In regard to our Shows, I may say at once that Chelsea is not possible this year. Our Show ground is in the occupation of the military, and in fact their dug-outs even rival the excavations of Messrs. Sutton in pre-war years.

The Fortnightly Shows, complete with lectures and talks where they can be arranged, and with competitions, will carry on as usual this summer unless events prevent it. The continuation of the Shows is, I understand, welcomed by the trade and by the kindred Societies, and we believe that we shall have no lack of willing exhibitors to keep our Halls furnished on the appropriate days.

This last winter, to our very great regret, it was not possible to hold our Shows ; as you will remember there was a great deal of disorganisation and uncertainty. Running the Shows would have meant forced flowers and there were more than rumours of drastic restriction in the supply of fuel, and above all, the "black-out" would have necessitated either the most meticulous screening of all the windows of the Hall, or it would have meant the Shows would have had to close at

a very early hour indeed in the afternoon. So we were, therefore, forced to forgo the Shows in the autumn, except for that one very successful Show that we had in place of the cancelled Autumn Show of October 24 and 25, where there was a great display of plants, and when the Hall was more crowded than I have ever known it for a Fortnightly Show. That Show has encouraged us to continue with the programme this spring and summer and autumn.

I may add that at the end of September or the beginning of October we propose to organize, as was done during the last War, an exhibition and sale of plants, bulbs and seeds to aid the funds of the Red Cross. In the last War such an event produced, I believe, over £2,000 for the Red Cross funds, and I hope we may be able to do, if possible, even better this year.

Our publications will proceed practically as usual. As regards the Royal Horticultural Society's Dictionary of Gardening, there is no reason why it should not proceed, and it is proceeding, under the very able Editorship, as you will have heard, of our friend, Mr. CHITTENDEN.

May I say here how deeply we regret the end of his long association with the Society as one of its leading officials, but we hope and believe that his association with the Dictionary of Gardening will leave a more permanent mark on horticulture even than his work as an official of the Society.

The Botanical Magazine will be published as usual and the Lily and Daffodil Year Books will make their appearance again this year. The JOURNAL is continuing in its monthly parts. It is slimming a bit as you will have seen—that is a war-time fashion, I believe—whether it be due to the rationing of paper or the rationing of butter.

Then we are engaged on the publication of certain monographs. Sir DANIEL HALL has prepared a monograph on Tulips, Major STERN has prepared one on Paeonies, and Mr. BOWLES—although that will be a little bit later than the other two—is preparing one on Anemones. The authors have most generously presented the Society with the text and with the beautifully coloured drawings which will be reproduced in the published works. There could be no better books than monographs written, as these will be, by the recognized experts on the subjects, and written by them as a labour of love.

With regard to Wisley, we shall place more emphasis than usual, as is the case in all gardens, on fruit and vegetables, both in the garden itself and in the research laboratories. Special vegetables will be grown on the Vegetable Trial Ground for demonstration and selection purposes. The demonstrations also of garden operations will be more extended, because, as perhaps you know, they are extremely well attended. We do not propose, you will be glad to learn, to uproot our flowers and shrubs : the standard collections will be maintained and certain trials of flowering plants will proceed.

Visitors, I am afraid, will be fewer than in past years—there is too much war work and too little petrol—but I would say this, that if you can come to Wisley half as often, you should stay each time

twice as long, because I can assure you that the plants at Wisley will well repay a very close and meticulous examination.

In regard to food production, we have been in close co-operation with the Ministry of Agriculture. We have appointed a panel of gardeners, 300 in number, who are prepared to lecture and give advice on matters of food production, and I understand from our Secretary that over 100 lectures have already been delivered or are announced.

We are also considering the publication of a pamphlet on the subject of cooking vegetables, because you have not only got to grow your vegetables, but you have got to cook them to the best advantage with the limited means available.

To sum up, Ladies and Gentlemen, the policy of the Society, and I believe it is the right one, will be to continue our activities to the utmost that circumstances will permit, and "circumstances," as you will guess, is a periphrasis for HITLER.

There are this year, of course, the usual Council changes. The late Mr. BUNYARD retired from the Council to become our Editor, and his death shortly afterwards leaves us all with a very deep sense of loss. His work, especially for fruit, was admirable, and the results will survive him. Sir DANIEL HALL, I am glad to say, succeeds to the Editorship of the JOURNAL and of our other publications, assisted by Mr. HAY, not the well-known Mr. HAY, the member of Council, but a junior Mr. HAY, his son, whom I know in time will become as well known as his father. The Society has been most fortunate in securing the assistance of Sir DANIEL HALL and Mr. HAY for their publications.

Mr. CHEAL, of the well-known firm, succeeds to the Council to represent trade matters in Mr. BUNYARD's place. Dr. TAYLOR also will join us. Dr. TAYLOR is Commissioner of Horticulture at the Ministry of Agriculture, and will be a link with that body which will be most valuable to us in our activities at the present time. Dr. TAYLOR was elected to the Council on Mr. BUNYARD's retirement, but of course he could only take Mr. BUNYARD's place as far as length of appointment was concerned. Mr. BUNYARD ordinarily would have retired from the Council at this meeting, and in order that we might not lose Dr. TAYLOR's services, the Council decided to exercise that prerogative which is given to them by the Charter, and ask the Society to re-elect Dr. TAYLOR a member of the Council without the usual interval of one year.

Professor WEISS, the distinguished scientist, also retires this year, and he is being replaced by Professor BLACKMAN, also a most distinguished scientist. I will not say which is the most distinguished, I only know, as a layman, I hold both of them in great awe.

Major STERN, who has been of such help to us in many ways, as Chairman of many of our Committees and Joint Committees, is leaving us, we hope only for a year, and an old member of Council, Mr. J. B. STEVENSON, who has a very expert knowledge of publications and of building, is joining us in his place.

In conclusion, Ladies and Gentlemen, I would like to express on

behalf of the Council and myself our very deep gratitude to all those who have helped us in our work.

The Staff never spare themselves. In September they stuck to their posts in London though many others fled. I rather think we ought to reward them with a medal, on the obverse of which might be struck a representation of the stirring incident of Casabianca.

Our Committees have on them horticultural, scientific and business experts ; they give their time and their expert knowledge unreservedly to our work and we owe them a great debt of gratitude for this.

I must not forget the exhibitors, they make our Shows, and as we know they have not lost heart.

Then last, but not least, there are our Fellows, our Fellows who I hope will be faithful and are faithful to the Society in difficult times, the Fellows who pay the President, the Council and the Staff the greatest and best of all compliments by giving them year in and year out their most loyal support.

I will ask our Treasurer, Mr. MONRO, to second the Motion I have moved.

Mr. G. MONRO : Mr. President, Ladies and Gentlemen, it has been customary for the Treasurer to second the Motion for the adoption of the Report, and in doing so to give a brief account of the financial working of the Society during the previous year.

The Accounts for the year are printed in the February JOURNAL, which is now in your hands.

You will see that, in spite of the political unrest which ended in the outbreak of war last September, the position of the Society at the close of the financial year is nevertheless sound and favourable, and that it has been possible to add to the reserve funds of the Society.

Coming to the various items in the Accounts, and taking the expenditure first, the establishment expenses follow naturally the activities of the Society. They appear to show an increase of about £400 over the previous year, but that is not quite a correct showing of the position, because it is really due to having to carry the burden of allocations which are normally debited to the Shows and Meetings which, owing to the outbreak of war, had to be cancelled ; Head Office expenses therefore had to carry them as well.

The printing and postage accounts are normal. There is a slight increase due to the falling off of the revenue from advertisements during the last three months.

The expenses of the Meetings, on the other hand, that is the Shows, show a large increase, and this mainly arises out of the expenditure of over £2,000 on the Autumn Show, which, as you all know, had to be cancelled, and we were unable to get a return of that £2,000, although I do not mind telling you we tried very hard.

Coming now to special expenditure of the Society, there is no item of great importance to draw attention to. Provision has been made

for the payment of £500 due to the Clarendon Press, by arrangement on the publication of the Supplement to the Index Londinensis (Pritzel Revision).

An amount of £358 was expended on Air Raid Precautions at the Head Office in Vincent Square and at Wisley, also to provide for the event of the Staff being evacuated from the London Offices to the Society's Gardens. As the President told you, the Staff carried on.

The Library has been fully maintained ; the surplus books of the Cory Bequest have been in part sold for £1,121, and that amount will be reserved for the purchase of further books which will be added to the Cory Bequest, and thus the Library will continue to benefit from this generous gift for some time to come.

The Society's buildings have been maintained, and no heavy expenditure was necessary during the year.

On the Receipt side the annual subscriptions show a very slight decrease, the figure being maintained practically at the same figure as at the end of 1938. Of course the bulk of the drop will come now, because when war was declared in September the majority of the members had already paid their subscriptions.

I would add that it is essential to maintain this revenue if the good work of the Society is to be carried on for the benefit, not only of the Fellows, but of the country itself.

The Hall lettings have naturally declined, as it is in the autumn when some of the most profitable lettings take place, and practically every one of these was cancelled. It is not to be expected that the revenue from Hall lettings will reach the same amount in war time as it did in peace time. This has, of course, also affected the Restaurant Account.

There is nothing of outstanding importance to report in connection with the Wisley Gardens, beyond that the laboratory and buildings have been re-decorated and repaired, and the greenhouses repainted and all glazing maintained. The expenditure at Wisley shows a slight decrease of some £550.

Turning to the Balance Sheet of the Society, it will be noted that there has been from the ordinary Revenue and Expenditure Account a balance of £8,646 added to the General Reserve, which together with a refund of tax now stands at £50,008 as against £39,844 twelve months ago.

The Sinking Fund of the two Halls has received the annual appropriation of £3,366, plus the interest which is shown by the amount which is always added to that Fund, and the Fund now stands at £30,353.

There has been a change in the naming of one Account ; the Weather Insurance Fund is now recorded as "Shows Contingency Fund," and this fund of £3,000 will be allowed to accumulate its own interest. It was considered that, in view of the growth of the Society, and the increased cost of the staging of the Society's meetings, it

XXX PROCEEDINGS OF THE ROYAL HORTICULTURAL SOCIETY.

would be wiser to increase the fund of £3,000 which has been standing at this figure for so many years.

Now it is difficult to forecast what the future will bring or what funds the Society will have at its disposal in the way of ordinary revenue, but the President has outlined to you the programme which the Society proposes to carry out during the war period, and this programme will, of course, be dependent very largely on the normal revenue of the Society.

I have given you but a short summary of the Accounts which, considering all the circumstances, I think must be deemed most satisfactory, but should anyone here present desire any further explanations, our Auditors, who are present, and myself as far as I may be able, will be only too willing to clear up any points that may be raised.

Finally, I want to take this opportunity to express the Society's thanks to the members of the Press, both Trade and Daily, for the great encouragement that they have given to the Society and its work, and to say that we look to them for their help during the trying times which we are facing, and we hope it will be as good in the future as it has been in the past.

I have much pleasure in seconding the adoption of the Report.

The CHAIRMAN : Is there any Fellow who desires to ask any question ?

Sir HARRY BRITTAI N : I do not know whether I am entirely out of order, but I should like, on my own behalf, and I do not doubt on behalf of very many here, to offer my very humble congratulations to yourself and the Council for the splendid way in which you have carried on.

In the appalling weather through which we are now passing I cannot imagine any greater tonic one could possibly have than to come into this Hall with its blaze of flowers ; we realize that the Society is indeed carrying on through this War, that it has not left London as have many Government Departments and so many businesses, but has stuck to its post with the whole available Staff. That does redound to the credit of the Society. Few of us care to part with money these difficult days, but there is no cheque which I always write out with greater pleasure than the little cheque which secures my annual membership of the R.H.S.

May I conclude by wishing the Society ever-increasing prosperity and success.

The CHAIRMAN : That is a very pleasant form of criticism, and we are very thankful to the Fellow who has made it, and to you all for the way in which you received it.

If there are no more questions, I will now put the Motion.

(Motion put and carried unanimously.)



FIG. 30.—THE GLAZED FROST, JANUARY 1940.
(See p. 118.)

[To face p. xxx.]



FIG. 31.—THE GLAZED FROST, JANUARY 1940.
(See p. 118)



FIG. 32.—THE GLAZED FROST, JANUARY 1940.
(See p. 118.)



Photo: N. K. Gould]

FIG. 33.—*DOCYNIA DELAVAYI*, LEAVES AND FRUIT.
(See p. 120.)



Photo N K Gould]

FIG. 34.—*DOCYNIA DELAVAYI* IN FLOWER.
(See p. 120.)

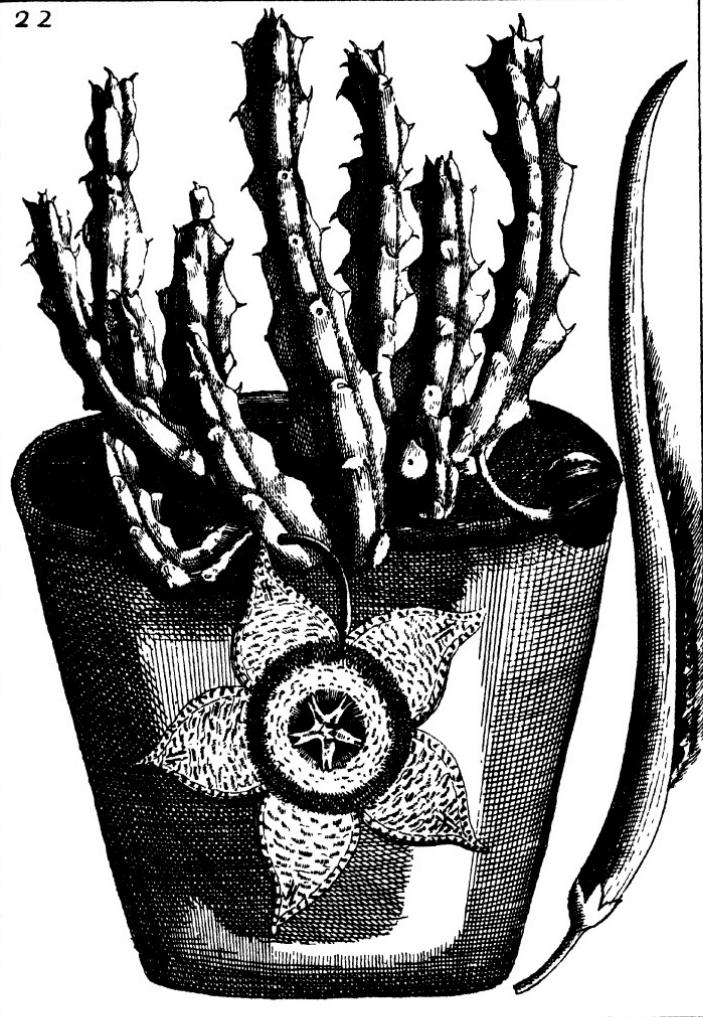


FIG. 35.—*STAPELIA VARIEGATA.*
(See p. 117.)

Fig. 19.

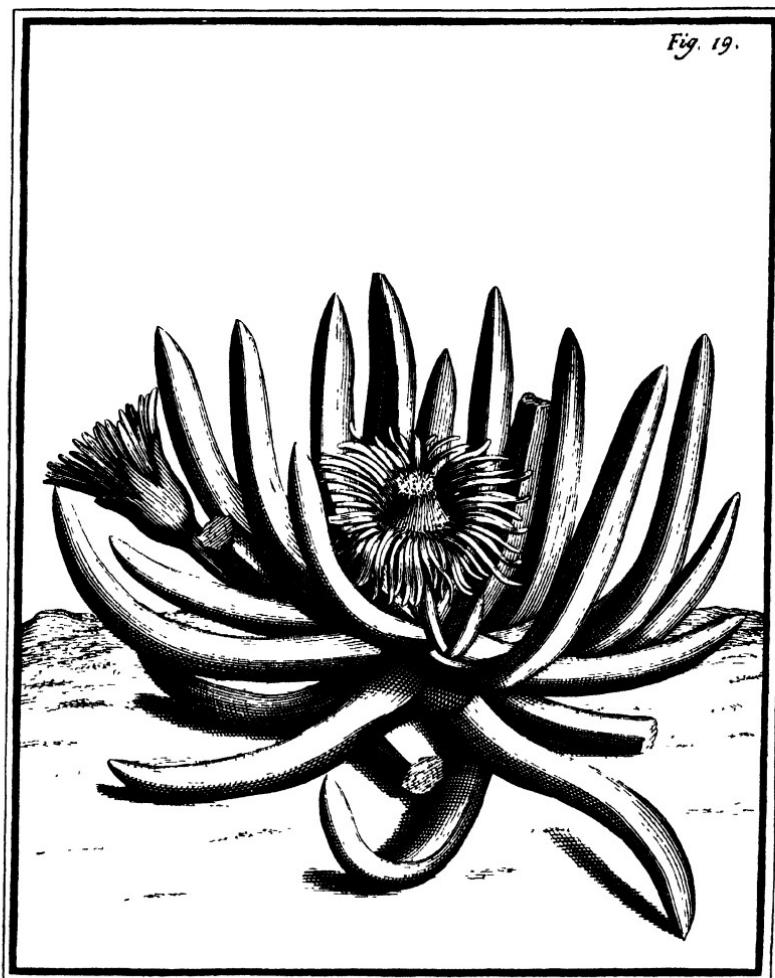


FIG. 30.—*CYLINDROPHYLLUM CALAMIFORME.*
(See p. 117.)



FIG. 37.—*EUCRYPTHIA GLUTINOSA.*
(See p. 123.)

[To face p. xxxi.

Mr. E. A. BOWLES : Ladies and Gentlemen, Lord ABERCONWAY has just finished his arduous year's work as President of this Society in declaring the adoption of the Annual Report. It now becomes my turn as Vice-Chairman of the Council to conclude my annual duties by making an announcement to you.

I must tell you that at the moment you have no President, but that that deplorable state of things need not last long, for I have great pleasure in announcing that in response to the unanimous desire of the members of the Council, and there being no other name put forward, Lord ABERCONWAY very kindly accepted another year's office. I therefore declare Lord ABERCONWAY is duly elected as your President.

The CHAIRMAN : Mr. BOWLES, Ladies and Gentlemen, I am most sensible of the very great honour you have done me again to elect me as your President. Much of my own time is spent in planning and urging on production of shells, of aircraft, and vessels of war, and it is extremely pleasant to come here periodically for a few hours into an atmosphere of plants and flowers and peace-time crafts, and I thank you very sincerely for enabling me to do this.

I declare the election of the following gentlemen as Vice-Presidents, there being no other nominations :

The Duke of Bedford.
The Duke of Portland.
The Marquess of Headfort.
The Viscount Ullswater.
Sir Daniel Hall.
Lieut.-Colonel Sir David Prain.
Mr. E. A. Bowles.
Mr. C. T. Musgrave.
Mr. C. G. A. Nix.

I also declare the election of the following members of the Council, there being no other nominations :

Professor V. H. Blackman.
Mr. A. Cheal.
Mr. J. B. Stevenson.
Dr. H. V. Taylor.

I also declare the election of Mr. G. Monro as Treasurer. May I in doing so stress the obligation the Society is under to so busy a man as Mr. Monro for giving the amount of time he does to the Society's financial and other affairs.

I declare further the election of Mr. J. S. Feather, of Messrs. Harper, Feather & Paterson, as Auditor.

I will now make the various presentations.

Victoria Medals of Honour.—To British Horticulturists resident in the United Kingdom and deserving special honour at the hands of the Society.

The SECRETARY : The MARQUESS OF HEADFORT.

The CHAIRMAN : Lord HEADFORT is not only a most distinguished horticulturist, but he has the most complete collection of Conifers, I believe, in the world. When I first had the privilege of visiting his garden, I asked him to show me every possible Conifer I could recollect, and we tramped through swamp and thicket and found every one ; the only flaw was that two of them were dead. I am most pleased to make this presentation.

The SECRETARY : Mr. ALEXANDER DICKSON.

The CHAIRMAN : Mr. DICKSON, unfortunately, is not able to be with us to-day. His age is 82 ; you all know him very well, and we know how his wonderful Roses are grown in gardens in all parts of the world. We wish him many years yet to continue his work on Roses.

The SECRETARY : Mr. C. P. RAFFILL.

The CHAIRMAN : Mr. RAFFILL's name is a household word, not only as a great administrator at Kew, but as a real lover of plants. As all of you who know him are aware, all kinds of plants, even the most difficult Lilies—if I may use a very graceful American expression—“ grow for him ” in a way in which they grow for very few other people.

The SECRETARY : Mr. J. B. STEVENSON.

The CHAIRMAN : Mr. STEVENSON is a most distinguished cultivator of Rhododendrons. Part of his garden is set aside for the growing of Rhododendron species, and they are there arranged in their proper series for scientists to look at.

As Associates of Honour the following have been elected :

Mr. WILLIAM CLARK, Park Superintendent of Southport.

Mr. F. HANGER, Gardener to Mr. Lionel de Rothschild.

Mr. J. JEFFREY, Head Gardener to The Earl of Lonsdale.

The Lawrence and Holford Medals.—To Lord SWAYTHLING for his exhibit of Lilies staged on July 4, 1939.

The Veitch Memorial Medal in Gold.—To Sir DANIEL HALL.

Veitch Memorial Medal in Silver.—To Dr. KATE BARRATT.

The Sander Medal.—To Sir JEREMIAH COLMAN, for his Lycaste ‘ Sir Jeremiah Colman ’ shown on January 24, 1939.

The George Moore Medal.—To Mr. H. P. LAWSON for his Cypripedium 'Miracle var. Alpha' shown on June 20, 1939.

The Williams Memorial Medals.—To Baron BRUNO SCHRÖDER for his exhibit of Cymbidiums staged on March 21, 1939.

To Messrs. R. BOLTON & SON, for their exhibit of Sweet Peas staged on June 6, 1939.

The Reginald Cory Memorial Cup.—To Dr. C. C. HURST for his *Rosa 'Cantab'* (*Rosa nutkana* × *R. 'Red Letter Day'*), shown on June 6, 1939.

The Loder Rhododendron Cup.—To Mr. GEORGE H. JOHNSTONE, for his work as a noted amateur grower and hybridizer of Rhododendrons.

Sir ARTHUR HILL : I have much pleasure in proposing a vote of thanks to our President for presiding at this meeting and for the very able way in which he has conducted the business. He has done so in his usual felicitous manner, to which we always look forward at these annual meetings. We also have to thank him in these depressing times for reviving our spirits by his humorous references and by his sound comments on the importance of the Society carrying on its work as fully as possible.

I feel sure we are all very glad that the Council has decided to resume the normal activities of the Society, and to give us the pleasure of seeing the flowers and kindly fruits of the earth in their season at the Fortnightly Shows.

You will, I think, be interested to know that the Ministry of Agriculture and Fisheries have agreed that the work of Kew should be carried on as normally as possible, so that visitors may have the opportunity of enjoying the beauty of trees, flowers and shrubs as usual. I much hope that circumstances will allow that visitors may take full advantage of this opportunity of rest and refreshment. I should add, however, that we have made no arrangements whatever for protecting our visitors in case of air raids. It would be quite improper to allow the lawns or flower beds to be dug up and burrowed under for providing shelters, which, owing to the extent of the Gardens, would probably not have been found, had they been made. The only advice we can give to our visitors, should there be a warning whilst they are in the Gardens, is that the safest plan will be for them to lie on their stomachs under the trees, where, I am given to understand, they should be comparatively safe.

It is most important, as the President has said, that we should try and get as much enjoyment as we can from our flowers and gardens during these difficult times, and so have some relaxation from our worries, for gardening is certainly one of the greatest refreshments for the spirit of man.

I have much pleasure in proposing this vote of thanks.

Mr. H. H. CRANE : It gives me very much pleasure to second the Vote of Thanks.

(*The Motion was put by Sir ARTHUR HILL, and carried with acclamation.*)

The CHAIRMAN : Dr. HILL, Mr. CRANE, Ladies and Gentlemen, I thank you most sincerely for the way in which you have proposed, seconded and received this Motion. These meetings are always very pleasant for me, and I am very grateful to you for the way you hear what we have to say. I can only hope that next year we may have a meeting in pleasanter circumstances than this year. I thank you all, Ladies and Gentlemen.

That concludes the business of the meeting.

(*The proceedings then terminated.*)

GENERAL MEETINGS.

FEBRUARY 20, 1940.

Silver-gilt Grenfell Medal.

To Mrs. Vera Higgins, Croydon, for an exhibit of water-colour drawings of Dendrobium species.

Grenfell Medal.

To Mrs. M. E. Robinson, Maresfield Park, for an exhibit of water-colour drawings of varieties of Hibiscus and photographs of plants.

To Miss G. Thomasset, Lee, for an exhibit of water-colour paintings of flowers.

FRUIT AND VEGETABLE COMMITTEE.—Mr. F. A. SECRETT, V.M.H., in the Chair, and eighteen other members present.

Awards Recommended :—

Silver-gilt Hogg Medal.

To Messrs. J. C. Allgrove, Ltd., Middle Green, Langley, Slough, for collection of Apples and Pears.

Silver Hogg Medal.

To Messrs. J. Cheal & Sons, Ltd., Crawley, Sussex, for collection of Apples.

Silver-gilt Knightian Medal.

To Messrs. Sutton & Sons, Ltd., Reading, for group of Vegetables.

Selected for Trial at Wisley.

Apple 'Sotwell Surprise,' from Mr. W. F. Turner, "Allnuts," Sotwell, Nr. Wallingford, Berks.

Other Exhibits.

Mrs. A. Arther, Boschetts, Northland Park Drive, Pitsea, Sussex : seedling Apple.

Mr. Howard H. Crane, Highmead, Cheney Lane, Eastcote, Pinner : Apples 'Claygate Pearmain,' 'Laxton's Superb' and 'Rosemary Russet.'

The Director, John Innes Horticultural Institution, Mostyn Road, Merton Park, S.W. 19 : collection of seedling Apples.

The Director, John Innes Horticultural Institution : seedling Apples Nos. 180, 857, 920.

Mr. W. H. Divers, Westdean, Hook, Nr. Surbiton, Surrey : Apple 'Barnack Orange.'

Mr. J. A. Pateman, 15 Addison Way, Golders Green, N.E. 11 : seedling Apple.

Mr. W. B. Bashyr Pickard, Darullah, Bengeo, Herts : Apple 'Darulla.'

R.H.S. Commercial Fruit Trials, Wisley : collection of Apples.

R.H.S. Commercial Fruit Trials : Apples 'Rosemary Russet' and 'Winter King.'

Mr. R. Staward, The Gardens, Ware Park, Ware, Herts : Apples 'Ajax,' 'Dawn' and 'George Pyne.'

FLORAL COMMITTEE A.—Mr. G. W. LEAK, V.M.H., in the Chair, and eighteen other members present

Awards Recommended :—

Silver Banksian Medal.

To Messrs. R. H. Bath, Ltd., Wisbech, for Daffodils, Tulips, Freesias, Crocuses.

To Messrs. Blackmore & Langdon, Bath, for Cyclamens.

To Messrs. C. Engelmann, Ltd., Saffron Walden, Essex, for Carnations, Chrysanthemums, *Euphorbia fulgens*, etc.

To Messrs. J. R. Pearson & Sons, Ltd., Lowdham, Notts., for Daffodils and Hyacinths.

Flora Medal.

To Messrs. Allwood Bros., Haywards Heath, for Carnations.

Banksian Medal.

To The Stuart Low Co., Enfield, for Carnations.

To Messrs. Wakeley Bros. & Co., Ltd., 74 Bankside, London, S.E. 1, for Daffodils, Hyacinths, Crocuses.

Selected for trial at Wisley.

Primula malacoides 'Charming.'

Primula malacoides 'Simplicity.'

all from Messrs. Sutton & Sons, Ltd.

Awards Recommended after trial at Wisley.

Award of Merit.

To *Primula malacoides* 'Dignity,' from Messrs. Sutton & Sons, Ltd.

To *Primula sinensis* 'Double Charm,' from Messrs. Hurst & Son, 152 Houndsditch, London, E.C. 3.

Highly Commended.

To *Primula malacoides* 'Mauve Queen,' from Messrs. Sutton & Sons, Ltd

Other Exhibits.

Messrs. W. A. Constable, Ltd., Tunbridge Wells : Lachenalias.

Messrs. Sutton & Sons, Ltd., *Primula malacoides* 'Loveliness' (to be seen again), *P. malacoides* 'Majestic.'

Mr. F. L. White, Polegate, Sussex : Grass.

FLORAL COMMITTEE B.—Lord ABERCONWAY, C.B.E., V.M.H., in the Chair, and twenty other members present.

Awards Recommended :—

Silver Flora Medal.

To Messrs. J. Cheal & Sons, Ltd., Crawley, for flowering trees and shrubs.

To Knap Hill Nursery, Ltd., Woking, for flowering trees and shrubs.

Silver Banksian Medal.

To Messrs. Hillier & Sons, Winchester, for flowering and evergreen shrubs.

To Messrs. L. R. Russell, Ltd., Windlesham, Surrey, for flowering trees and shrubs.

Flora Medal.

To Mr. K. W. Harle, Lower Basildon, Berks., for succulents.

To Mr. E. Ladham, Elstead, Godalming, for evergreen shrubs.

To The Stuart Low Co., for Camellias and other shrubs.

To Swanley Horticultural College, Swanley, for Begonias and other tender plants.

Banksian Medal.

To Messrs. Barr & Sons, Covent Garden, W.C. 2, for Narcissi and other bulbous plants.

To Mr. E. Ladham, for a rock garden.

To Orchard Neville Nurseries, Ltd., Baltonsborough, Somerset, for rock garden plants.

XXXVI PROCEEDINGS OF THE ROYAL HORTICULTURAL SOCIETY.

To Messrs. M. Prichard & Sons, Ltd., Christchurch, Hants, for rock garden plants.

To J. Southgate, West Ewell, Surrey, for succulents.

To Messrs. D. Stewart & Son, Ltd., Wimborne, for Narcissi and flowering shrubs.

Award of Merit.

To *Leptospermum scoparium* var. *eximium* as a hardy flowering shrub (votes unanimous), from Lionel de Rothschild, Esq., Exbury. See p. 122.

This award was recommended, subject to naming, on May 10, 1938, when specimens were exhibited as *L. scoparium* Comber 1508.

Other Exhibits.

Baggesen's Nurseries (1936), Ltd., Pembury, Kent: flowering and evergreen shrubs.

Mr. A. Corderoy, Eltham, London, S.E. 9: rock garden plants.

Mrs. K. Hopkinson, Coulsdon, Surrey: rock garden plants.

Mr. J. Klinkert, Richmond, Surrey: topiary.

Messrs. W. T. Neale & Co., Ltd., Worthing: succulents.

Mr. G. G. Whitelegg, Chislehurst, Kent: conifers.

ORCHID COMMITTEE.—Sir JEREMIAH COLMAN, Bart., V.M.H., in the Chair, and thirteen other members present.

Awards Recommended:

Silver Flora Medal.

To Messrs. Charlesworth & Co., Haywards Heath, for a group of Orchids.

To Messrs. Black & Flory, Slough, for a group of Cypripediums.

To Messrs. J. & A. McBean, Cooksbridge, Sussex, for a group of Cymbidiums.

Silver Banksian Medal.

To Lady Leconfield, Petworth Park, Sussex (gr. Mr. F. Streeter), for an attractive exhibit of cut spikes of *Calanthe* × 'Baron Schröder.'

First-class Certificate.

To *Odontonia* × 'Poinesta' (*Odontonia* × 'Nesta' × *Odontoglossum* × 'President Poincaré') (votes 9 for, 3 against), from H. Barnard-Hankey, Esq., East Burnham Park, Slough, Bucks. See p. 122.

Award of Merit.

To *Cymbidium* × 'Hawfinch' var. 'Emerald' ('Bustard' × *Alexanderi*) (votes 11 for, 0 against), from Sir William Cooke, Bart., Wyld Court, Hampstead, Newbury, Berks. See p. 122.

To *Cymbidium* × 'Ruanda' var. 'Queen of the Pinks' ('Redstart' × 'Pearl') (votes 9 for, 3 against), from Messrs. J. & A. McBean. See p. 122.

To *Cypripedium* × 'Aylesbury' var. 'Picture' ('Euryostom' × 'Everest') (votes 9 for, 3 against), from Messrs. Black & Flory. See p. 122.

To *Odontioda* × 'Saxa' (*Oda* × 'Memoria Pantia Ralli' × *Oda*. × 'Marie Antoinette') (votes 9 for, 0 against), from Messrs. Charlesworth & Co. See p. 122.

Cultural Commendation.

To Messrs. Charlesworth & Co. for *Odontoglossum* × *Perryanum*, with a spike of twenty-two well-formed flowers.

Other Exhibits.

E. Kenneth Wilson, Esq., 'Cannizaro,' Wimbledon: *Vuylostheara* × 'Cambria.'

R. F. W. Cartwright, Esq., Aynho Park, Banbury: *Calanthe* × 'Baron Schröder.'

L. W. Brummitt, Esq., Bloxham Road, Banbury: *Cypripedium* hybrids.
Messrs. Sanders, St. Albans: *Cymbidium* × 'Regina.'

OTHER COMMITTEES.

The Narcissus and Tulip Committee, the Joint Rhododendron Committee and the Joint Rock-Garden Plant Committee met, but no plants came before them on this occasion.

DONATIONS TO THE SOCIETY'S GARDENS AT WISLEY, 1939.

ABERCONWAY, Lord, Tal-y-Cafn, N. Wales; plants of *Camellia saluenensis* hybrid, *Michelia Dollopsa*. Cuttings of *Camellia saluenensis* hybrid. AHRENDT, Rev. L. W. A., Watlington, Oxford; plant of *Cotoneaster* sp., Cooper 1374. Cuttings of *Berberis floribunda* and *B. umbellata*. ALGIERS, UNIVERSITY BOTANIC GARDEN, N. Africa; collection of seeds. ALLEN, A. L., St. James's Street, S.W. 1; seeds of *Onopordon Salteri*. AMSTERDAM BOTANIC GARDEN; collection of seeds. ANDERSON, N. S., Tregrehan Gardens, Par; plants of *Berberis asiatica*, *Camellia reticulata* × *Philaleria Veitchii*. ANDERSON, Prof., U.S.A.; seeds of *Liatris pycnostachya* f. *Hubrichtii*. ANLEY, Mrs., Wych Hill Lane, Woking; collection of seeds and plants for rock garden. Seeds of *Enkianthus quinqueflorus*. ARCTO-ALPINE BOTANIC GARDEN, U.S.S.R.; seeds of *Cotoneaster uniflora* and *Iris Bloudowii*. ARMITAGE, Miss, Dadnor, Ross; seeds of *Sophora tetaptera* var. *microphylla*. ARNOLD, Mrs., Seale, Surrey; plant of *Moricandia violacea*. ARNOLD, Mrs. C., California; seeds of *Bursera microphylla* and *Chilopsis linearis*. ASHKABAD BOTANIC GARDEN, U.S.S.R.; collection of seeds. AYLMER, Miss, Ascania, Budleigh Salterton; corms of *Sparaxis bulbifera*. BAGGESEN'S NURSERIES, Messrs., near Tunbridge Wells; collection of Chinese trees and shrubs. BAKER, Mrs. H. C., Oaklands, Almondsbury; plants of *Anemone glaucafolia* and *Lotus Salzmanni*. Cuttings of *Phlomis* spp. BALCOMBE, W., Sindlesham House Gardens, Wokingham; collection of seeds BALLS, E. K., Exped. (see also under Edinburgh); seeds and bulbs from Andes Expedition. BARR & SONS, Messrs., Covent Garden, W.C. 2; corms of *Crocus* spp. BATH, Messrs. R. H., Wisbech; plants of Raspberry 'Deutschland.' BAYLOSS, B. E., Windridge, Brentwood; bulbs of *Allium* from Iraq. BELVEDERE BOTANIC GARDEN, Wien, Germany; collection of seeds of alpine plants. BEograd BOTANIC GARDEN, Jugoslavia; collection of seeds. BERGIAN BOTANIC GARDEN, Stockholm; collection of seeds. BERKELEY, R. G., Spetchley Park, near Worcester; collection of seeds. Bulbs of *Narcissus Triandrus* var. BEGAN-WALKER, T., Dicksons Drive, Chester; seeds of Tomato 'Television.' BLAKE, E. S., Woodham, Weybridge; seeds of *Lilium regale*. BLAXHILL, A. D., Braiswick, Colchester; cuttings of *Erica Tetralix* var. *alba*. BOOTHMAN, H. S., Nightingale Nursery, near Maidenhead; collections of plants for rock garden. BOWATER, N. J., Polyapex, Cobham; collection of seeds of Australian trees and shrubs. BRAGGINS, S. W. McL., Bordighera; seeds of hybrid *Mattiola*. BRITTON, Miss E. A., Washfield Nursery, near Tiverton; plants and bulbs for rock garden. BROOKSIDE NURSERIES, Oxford; plants of *Saxifraga Cotyledon* var. *rosea*. BROWNE, Mrs. B., Belsize Park, N.W. 3; roots of 'Uva Orchid' from Patna. BUCKWORTH, Mrs., Mulberry House, Weybridge; plants of *Antigonon leptopus* and *Plumiera acutifolia*. BULLEY, A. K., Neston, Cheshire; plants of *Ansaema candidissimum* and *Pulmonaria angustifolia* var. *Mawiana*. BUNYARD, Messrs. G. & Co., Ltd., Maidstone; two collections of *Rosa* species and varieties. Collection of nineteen varieties of Apples. BUTT, W., Chalford, Glos.; collection of sixty uncommon trees and shrubs. Plants of *Eremurus himalaicus*. BUTTON, C., Moor Lane, Cranham; collection of seeds from Himalayas. BUXTON, Prof. P. A., Grit Howe, Gerrard's Cross; seeds and bulbs of *Galanthus pluratus*. CAMBRIDGE BOTANIC GARDENS; plant of *Hidalgoa Wercklei*. CARTE, R. D'OYLEY, Kingswear, S. Devon; seeds of *Eucalyptus alba*. CARTERS, LTD., Messrs., Raynes Park, S.W. 20; collection of *Begonia* and other seeds. Seeds of Dutch Brown Bean. CHAMBERLAIN, W. S., Park Close, Hampton-on-Thames; plant of *Rosa mirifica*. CHAPPELOW, J. S., Highbury, N.; seeds of unknown plant. CHEAL & SONS, Messrs. J., Crawley; plant of *Berberis rubrostilla* var. *crawleyensis*. CHENERY, Dr. E. M., Maynell Cottage, Felkinstow; seedlings of *Chaetolepis alpestris* and *Orthrosanthus chimboracensis*. CRICHTON-MAITLAND, Mrs., Witham-on-the-Hill, Bourne; seeds of *Euonymus phellomanus* and *Hydrangea strigosa*. CHRISTCHURCH BOTANIC GARDEN, New Zealand; collection of seeds. CHURCHER, Miss, Lindfield, Hayward's Heath; large collection of Peonies. CLARKE, Col. R. STEPHENSON, Hayward's Heath; plants of *Asteranthera ovata*. CLARKE, Messrs. W. B. & Co., California, U.S.A.; grafts of *Prunus subhirtella* var. *pendula rosea plena*. CLAYDON, Miss M. E., Guest Road, Parkstone; seeds of *Mimulus moschatus*. CLAYTON and WOODROW, Messrs., Wisbech; plants of Strawberry. COATS, J., Bourton Gardens, Shrivenham; plants of *Ranunculus Ficaria* var. *plenus*. COLERIDGE, Mrs., Ottery St. Mary; seeds of *Lagerstroemia indica* (?). COOKE, R. B., Kilbryde, Corbridge-on-Tyne; seeds of rock garden plants. COPELAND, T., The Hatches, Finchampstead; seeds of *Araucaria araucana*.

XXXVIII PROCEEDINGS OF THE ROYAL HORTICULTURAL SOCIETY.

CORREVON, M. H., Chêne-Bourg, Geneva; collection of alpine seeds and plants. COX, A. H., Chestnut Avenue, Esher; plant of *Elsholtzia Stauntonii*. CRESSWELL, Mrs., Copse Hill, Ewhurst; plant of *Anigozanthos Manglesii*. Seeds from Western Australia. DALRYMPLE, B. H., Lyndhurst, Hants.; seeds of *Gaultheria tibetica*. Cuttings of *Calluna*, *Cytisus* and *Erica* varieties. Plants of *Gaultheria sinensis*. DANGERFIELD, W. H., Winnipeg, Canada; seeds of *Amaryllis*. DANKS, F., Canterbury, Australia; seeds of Reinelt Strain of *Delphiniums* and of Oriental Poppy hybrids. DAVIS, P. H., East Grinstead, Sussex; collection of seeds from Persia and Cyclades Islands, Greece. DIPPE, GEBRÜDER, A-G., Quedlinburg, Germany; seeds of *Aster*, *Calceolaria* and *Primula sinensis* forms. DIXON, Miss A., Batchwood Drive, St. Albans; plant of *Nepeta* sp. DOBBIN, Mrs. M. A., Blackshiel, Midlothian; seeds and seedlings of *Daphne Mezereum*. Collection of seeds of herbaceous and rock plants. DONARD NURSERY Co., Newcastle, Co. Down; collection of *Cytisus*, *Escallonia*, *Leptospermum* and other shrubs, twelve in all. DONCASTER, E. D., Burley, Hants; plants of *Astrantia major* varieties. Seedlings of *Primula Littoniana*, giant forms. DOORENBOS, S. G., The Hague, Holland; collection of old Roses (twenty-seven sorts), and other trees and shrubs. DUNEDIN BOTANIC GARDEN, New Zealand; collection of seeds. ECCLES, J. H., Tulbagh, S. Africa; bulbs of *Eulophia Brebbstii*, *Scilla natalensis* and *Tulbaghia pulchella*. EDINBURGH, ROYAL BOTANIC GARDEN; collection of *Meconopsis* and other seeds. Bulbs of *Lilium Martiae*, from Capt. Kingdom Ward's expedition. Plants of *Aristea capitata* and *Nepeta Stewartiana*. EDWARDS, J. E., Gibraltar; seeds of *Narcissus* species and other plants. Plants of *Fritillaria* and *Viola*, and corms of *Colchicum Bivonae*. ELLIOTT, C., Six Hills Nursery, Stevenage; plants of *Verbena corymbosa* and *Campanula linifolia* var. *cavadonga*. Seeds of *Ornithogalum Saundersae*. ENGELMANN, C., Saffron Walden; bulbs of *Lilium candidum* var. *salonikae*. EREVAN BOTANIC GARDEN, U.S.S.R.; collection of seeds. EW BANK, Misses, Ryde, I.O.W.; 150 bulbs of *Tulipa saxatilis*. FARDEN, R. W., Hoe Lane, Abinger Hammer; plants of *Kalanchoe beharensis*. FIELD, Mrs., Lingfield, Surrey; copies of R.H.S. JOURNAL, 1938. FOTHERGILL, J., Three Swans Hotel, Market Harborough; collection of Himalayan seeds. FOX, Mrs. M. J., New York, U.S.A.; seeds of *Elliotia*, *Stewartia* and *Gordonia*. FRASER, G., Ueluel, B.C.; seeds of *Rhododendron californicum* var. *grandiflorum* and hybrids. FRIKART, C., Switzerland; collection of seeds. FRITSCHE, G. E., Church Road, Winkfield; plants and seeds for rock garden. GALWAY, Viscount, Government House, Wellington, N.Z.; collection of New Zealand seeds. GATTEFOSE, J., Morocco; collection of seeds. GIUSEPPI, Dr. P. L., Felixstowe; plants of *Dracophyllum lusitanicum* and *Saxifraga globulifera* var. *erioloblasta*. GLASNEVIN BOTANIC GARDEN, Dublin; plants of *Cyananthus*, *Gaultheria*, *Indigofera* and *Pentstemon*. GLOVER, R., Barn Close, Haslemere; plant of *Nomocharis* (?) from Kumaon. GOULD, B. J., Sikkim; collection of seeds from Sikkim. GRAHAM, A., Botanic Gardens Park, Belfast; plant of *Primula pubescens* var. *alba*. GREEN, R., Gaywood, King's Lynn; grafts of seedling Peach. GREY, Countess, Eaton Place, S.W. 1; plant of *Primula sonchifolia*. HARLEY, A., Blinkbonny, Kirkcaldy; seeds of *Meconopsis* and *Nomocharis* species. HAWKER, Capt. H. G., Strode, Ermington; plants of *Delphinium Wellbyi* and *Sorbus oligodon*; cuttings of *Berberis Potaninii* (Farrer 358). HAY, T., Hyde Park, W. 2; plants of *Primula umbratilis* and *Campanula incurva*. HAYWARD, W., Florida, U.S.A.; seeds of hybrid *Hemerocallis*. HELY-HUTCHINSON, Mrs., Chippenham Lodge, Ely; seeds of yellow Kashmir Foxglove. HERKLOTS, Dr. G. A. C., University of Hong Kong, China; corms of *Gladiolus* and *Morea* species from Nyasaland. HILLIER, Messrs., Winchester; plant of *Pinus Lambertiana*. HILLING, Messrs. T., Chobham, Surrey; collection of plants and seeds for rock garden. Collection of ten forms of *Iris Kaempferi*. HIRANUMA, D., Yokohama, Japan; collection of native seeds. HOARE, M., Godstone; seeds of *Paeonia* sp. HOWARD, L. C., Godalming, Surrey; plants of *Calla palustris* (?) from N. Ontario. HOWARD, Mrs. A. L., Hale Cottage, Painswick; seeds of *Paeonia corallina*. HOWLETT, C. J., Earley, Reading; cuttings of four varieties of *Fuchsia*. HU, Prof. Expedition; collection of seeds from second expedition in China. HUGHES, G. E., Chigwell Row, Essex; seeds of unknown Nyasaland plant. INGRAM, C., Benenden, Kent; plant of *Rhododendron* 'Blue Tit.' Seeds of *Eucalyptus*, *Leptospermum* and *Pieris*. Cuttings of various shrubs; buds of *Prunus serrulata* 'Hisakura.' INNES, JOHN, Horticultural Institute, Merton Park, S.W. 19; plants of three varieties of Blackberries. Trees of eight seedling Plums. JOHNSON, Dr. C., Mayfield Lodge, Haslemere; seeds of Leguminous plant from Durban. JOHNSON, H. G. E., Throop, Bournemouth; plants of *Aubrieta* 'Coronation.' JOHNSTON, Major L., Menton, A.M., France; collection of seeds of rock garden plants.

(To be continued.)

IN THE LINDLEY LIBRARY.—II.

AN EARLY BOOK ON SUCCULENT PLANTS.

By VERA HIGGINS, M.A.

THERE has been a revival of interest in Cacti and other Succulents in recent years and a demand for more literature on the subject, yet few people know the first book ever to be written in the English language which deals exclusively with Succulent plants; it was published more than two hundred years ago, so that it is hardly surprising that few copies have survived.

This book is called "The History of Succulent Plants: containing The Aloes, Ficoid's (or Fig-Marygolds) Torch Thistles, Melon-Thistles, and such others as are not capable of an *Hortus-siccus*. Engraved, from the *Originals*, on Copper-Plates. With their Descriptions, and Manner of Culture," and the author was RICHARD BRADLEY, Fellow of the Royal Society who, in 1724, was appointed the first Professor of Botany at Cambridge.

BRADLEY appears to have been more gardener than botanist, but this little work was of sufficient merit to take its place in the literature of the subject; DILLENIUS, who published an account of JAMES SHERARD's garden at Eltham, "Hortus Elthamensis," in 1732, gives references to BRADLEY's plates, which were also cited by LINNAEUS and later, in 1799, by DE CANDOLLE in "Les Plantes Grasses"; as late as 1923 BRITTON and ROSE, in compiling their monograph on the Cactaceae, refer to BRADLEY's illustrations of Cacti.

BRADLEY's original intention was to publish fifty plates: "but finding that the Spirit of Botany was not powerful enough to pay the expence of Engraving the Copper-Plates, I have for some time discontinued my Thoughts of Publishing it; till now, at the Desire of some Friends (who are unwilling the Design should be totally laid aside, when many Tables are already finished) I have renew'd my former resolution of Printing it; but in such a Manner as will be more easy to the Purchaser"—that is to say, the work was to be brought out in parts; and BRADLEY evidently hoped to widen the scope, for he adds: "The Publishing of these Icons in Decades will give me Liberty (if I meet with Encouragement) to continue the Designing and Engraving of every Succulent Plant which is or can be discover'd either by myself or Correspondents."

But apparently he did not meet with sufficient "Encouragement," for only the fifty plates were published, the five decades being spread over eleven years. The first Decade appeared in 1716; the second was "Printed for William Mears, at the Lamb without Temple-bar, 1717"; the price is given as two shillings and there is a note "There

is a small Number printed on large Paper Colour'd," but whether any of these have survived I do not know. The third Decade did not appear until 1725, and there is a note on the last page: "This Work will now be carried on with all expedition," yet another two years passed before the fourth Decade was ready, while the fifth and final Decade appeared in the same year, 1727, but there are signs of haste in the incorrect numbering of four of its ten plates, which, though bound correctly in accordance with the "Directions to the Book-Binder," do not face the descriptive text intended to accompany them.

The book is of quarto size; each plate is printed on a separate sheet and faces the description of the plant which is given in Latin and in English in two parallel columns. These descriptions seldom run to a whole column each, but the essential points of colour and texture required to amplify the illustration are usually given, together with brief remarks on cultivation.

The plants which BRADLEY chose to illustrate include thirty Mesembryanthemums, seven Cacti, four Aloes (so-called), three Euphorbias, three of the Crassulaceae, two Stapelias and one Senecio. BRADLEY himself was responsible for the introduction into England of four of the plants he lists; he acquired them, not directly from South Africa, but from the Botanic Gardens of Amsterdam, with which he appears to have been familiar. These four plants are *Haworthia margaritifera*, which he calls the "Small Pearl'd Aloe"; *Stapelia hirsuta*, "the larger thick-leaved Cape Fritillary"; *Crassula tetragona*, "the Arborescent White-flower'd Cotyledon"; and *Rochea coccinea*, "the Scarlet-flower'd African Cotyledon," and of both the latter he says: "I brought this first in England, Anno 1714." So the scarlet Rochea which appears to-day as a decorative plant in florists' shops came to us from Holland more than two hundred years ago.

The majority of the plants given are still grown to-day, if only in specialized collections; two, however, have been lost sight of in the interval, but both, curiously enough, have been rediscovered within the last thirty years. *Opuntia curassavica*, to which is given the charming name of Pinpillow or Minion Prickly Pear, is one of the oldest species of opuntia known, having been described and figured as early as 1696, but it was lost to cultivation until 1913 when Dr. BRITTON rediscovered it on Curaçao. "The Small Night-Flowering Fig-Marigold" depicted in Plate 20 is not given either by DILLENIUS or by DE CANDOLLE; but HAWORTH wrote a description of the plant, based on this plate, giving it the name *Mesembryanthemum graniforme*, probably suggested by BRADLEY's description of the leaves as "hardly bigger than Grains of Wheat." ALWIN BERGER in 1909 calls the plant "an obscure species based by HAWORTH on an old plate," but in "Notes on Mesembryanthemum, Part II," by Dr. LOUISA BOLUS, she reports "a plant collected by Professor COMPTON in the Koup, Lainsburg Division, in July, 1928, flowered in my garden the following November and closely resembled BRADLEY's figure of *M. graniforme*, especially in regard to the size of the leaves and flowers."

The cultural directions given are generally sound ; there was a tendency among early growers to put new introductions into too high a temperature, beds of tanner's bark and near the flues of the stove being frequently recommended ; but BRADLEY did not fall into this error and suggests treatment more in line with modern ideas. For *Trichodiadema barbatum*, one of the shrubby Mesembryanthemums, he says it " may be exposed to the open Air from May till about October ; for this, and all other sorts of the same Tribe, delight to be abroad when the Air is not too sharp." Of *Haworthia margaritifera* he says : " The Off-sets of this Aloe may be taken from the Mother plant in July, and be planted for Increase, and the Leaves also will take Root, being planted at the same time " ; this reference to leaf cuttings is interesting ; the method is still practised to-day, but it is by no means easy to get Haworthia leaves to root. The leaves of *Crassula tetragona* do root easily, as BRADLEY also knew : ". . . given so much to Encrease, that even a fallen leaf will take root with only falling on the Earth."

From the artistic point of view the plates vary somewhat in merit ; some, especially the earlier ones, show the plants with a suggestion of scenery behind them, so that *Cereus peruvianus* appears like a colossus balanced precariously on the extreme edge of a cliff, and *Prenia pallens* lollops forward from low foothills like a young dragon ; but the character of the plant is usually well portrayed, indeed the suggestion of papillose leaves in *Drosanthemum micans* has been beautifully accomplished ; the worst plate from the point of view of accuracy is *Euphorbia heptagona* ; the general character of the plant leaves little doubt of its identity, but the spines occur at random on the ribs with no sign of the characteristic leaf-scar. Two striking plates, those of *Stapelia variegata* and *Cylindrophyllum calamiforme*, are reproduced in figs. 35 and 36.

All the plants shown can be identified with the exception of one, a Cactus which BRADLEY calls the " Small Six Ribb'd Torch Thistle " ; no flowers are shown (nor were known) and the three stiff branches jutting out from a squatter base, strongly suggest some of the maltreated cuttings of *Cereus* which can still be found in collections to-day and whose cultural deformities defy identification.

THE GLAZED FROST OF JANUARY, 1940.

By Sir A. D. HALL.

A "GLAZED FROST," as experienced on January 27 and 28, 1940, is so rare a phenomenon in England that it merits some record apart from its disastrous effects upon many gardens in the south of England.

Saturday, January 27, was felt as a break in the frost ; throughout the day the temperature was above freezing and the surface of the ground, by that time mostly bare of snow, was wet ; there was little wind, only a slight breeze from the north-east. Just after dusk a rather thick mist came over and one was aware of very fine rain in the air ; looking out (N.E. Hants.) at about 11 P.M. I was conscious that the mist was heavier and the exposed side of the house was becoming glazed over.

In the morning of January 28 the full effects of the weather were manifest—all exposed twigs and branches were encased in ice and the lawns were like rough matting with the blades of grass sticking up in cylinders of ice. Slender rods of Willow and Forsythia had round them ice to a diameter of about $\frac{1}{2}$ inch (see fig. 31), somewhat thicker on the exposed side. The Conifers were the most extraordinary sight, e.g. branchlets of Douglas Fir or Pinsapo with their leaflets were wholly enclosed in ice. The weight was enormous and many shrubs were bowed to the ground showing signs of breakage (fig. 30). On Sunday there was little change during the day ; the breeze bearing the mist continued and the ice thickened a little, but soon after dark a half-gale sprang up and one could hear the branches cracking.

Next morning revealed much destruction, not only on bushes but large trees exposed to the south-east wind (see fig. 32). The trees that suffered most were the Oaks, from which limbs up to 8 inches diameter were rent ; Silver Birches, of which young trees up to 20 to 30 feet in height were snapped in two ; Limes, the tops of which were reduced to bare poles ; and Walnuts, which lost heavy branches. Strangely enough the Conifers, though they carried the heaviest weights, were little harmed ; here and there the Douglas Firs had lost a branch or two, but the Deodars, whose lower branches had been frozen to the ground, emerged unhurt.

The accompanying photographs were taken at the Meteorological Office, Stonehurst, Glos., by an officer of the Air Ministry, by whose kind permission they are here published.

This "glazed frost" should not be confused with the more common "silver thaw." The latter phenomenon is due to a warm moisture-laden air impinging upon frozen ground at a temperature well below freezing. But on this occasion there had been a thaw and the ground was above freezing point. The cold came with the rain itself ; the fine drops were "supercooled" to a very low temperature ; as long as they were suspended in the air they remained liquid, but they would flash into ice on contact with any solid body.

SOME PLANTS IN THE SHOW.

February 21, 1940.

THE Informal Talk on this occasion was given by Mr. C. H. CURTIS, V.M.H., who discoursed upon the following plants :—

Apple 'Sandringham'.—This Apple has quite an interesting history. It was raised by a gamekeeper on the Sandringham estate, where all the employees have really good gardens of their own. His name was PERRY, and he named the Apple after the estate on which it was raised. It is interesting to know, especially now we are living under war-time conditions, that this is the Apple above all Apples which requires hardly any sugar. It has a large amount of sugar in it, so that further sweetening is not necessary. It is a useful late cooking variety. Indeed, some people consider it is good as a dessert Apple, but it is not generally so described. One disadvantage is that it does not fruit profusely in its earlier years.

Populus graeca pendula.—This plant is probably not strictly *Populus graeca pendula* but *Populus tremuloides pendula*. Nevertheless it is a very charming plant, especially when in flower. The "pendulous" form was discovered in a bed of seedlings about the year 1884 by a foreman who was employed by Messrs. BALLET Bros. in France. One seedling appeared which had a very pendulous habit and that seedling was isolated. From it has been secured the stock of this very graceful plant. The French people gave it a very appropriate name because Troyes was quite close to St. Julien, and so they called it "the Parasol of St. Julien," which describes it well. It is excellent for an isolated position on a lawn, especially as it flowers handsomely, but even when out of flower and in leaf it is very beautiful.

Cyphomandra betacea.—The fruits shown were those of what has been known for very many years as the Tree Tomato; it has a tree-like habit of growth, but it is not very big. It is an evergreen with small leaves, and the fruits hang from underneath its branches. It grows profusely under temperate conditions. In the Tropics, where the heat and moisture are such that ordinary Tomatos, although they grow profusely, do not fruit properly, the Tree Tomato is desirable as a change from tinned Tomatos. At Kew there is in the Temperate House quite a fair sized tree of this species, and in due season it produces ripe red fruits.

As the Tomato and Potato are herbaceous, with succulent stems, one would hardly imagine that the Tree Tomato, with its woody, tree-like habit, was related so closely to them, but this is so. All belong to the Solanaceae and their flowers are very much alike.

Mr. CURTIS talked interestingly and pleasantly about many other subjects :—Jerusalem and Chinese Artichokes, Salsify, *Lachenalia Nelsoni*, and double forms of *Primula malacoides*; the red-flowered *Cymbidium 'Rio-Rita'*; the large-flowered albino *Cypripedium 'Diana Broughton'*; *Odontonia Olga*, which seems to flower at all seasons of the year; Paper White Narcissus; and *Daphne odora*.

DOCYNIA DELAVAYI

By B. O. MULLIGAN, N.D.H.

AMONG the great number of trees and shrubs growing in the gardens at Wisley it would hardly have been thought probable that the genus of any of them could remain unknown after at least twelve years' growth, but such was the case with this small tree. Growing in a rather sheltered position in the border which runs along the south side of Seven Acres it had not produced any flowers, despite vigorous growth, until 1938, nor a fair crop of these until 1939. No member of the staff had been able to identify it from the habit, wood, and foliage characters alone, although these had some resemblance to species of Pyracantha or Cotoneaster and the family of Rosaceae was therefore suspected.

DESCRIPTION.

It is a tall, rather ungainly shrub or small tree now 14-15 feet in height, the principal branches arise three or more feet above the ground and spread in nearly horizontal tiers 7-8 feet on either side, so that the plant requires ample space for proper development. The old wood is nearly black in colour, but the hairy young shoots, in 1939 2-3 feet in length, become dark chocolate-brown and nearly smooth in their second year. Along the upper side of the branches numerous spurs or short lateral branches are formed which bear clusters of leaves or in due course flowers; sometimes they end in a thorn like those of the common Pear.

The alternate, evergreen leaves (fig. 33) are more or less lanceolate or ovate-lanceolate and similar in shape to those of some Privets such as *Ligustrum sinense*. They are from 1½-2 inches long, about $\frac{1}{4}$ inch wide, sharply pointed at the tip and very inconspicuously and sparsely toothed along the margin; the most noticeable feature is the dense coating of white hairs on the underside, extending also to the short ($\frac{1}{4}$ - $\frac{1}{2}$ inch) petiole.

The stalkless white flowers (fig. 34), in umbels of two to four and lightly Hawthorn-scented, appear in April; each flower measures 1-1½ inch across when fully expanded and has five spade-shaped petals frequently pink-tinted in bud. The tubular part of the calyx is covered with woolly hairs, the sepals less so. The five styles are joined (an important character of the genus) and in the lower part silky-hairy.

The Quince-like fruit (fig. 33)—the only one to be formed in 1939—measured 1½ inch in length and 1 inch wide. The side exposed to the light was a yellow-green hue marked with lenticel dots, the underside pale green, most of the surface thinly downy. Only two or three seeds were produced.

IDENTIFICATION AND HISTORY.

On flowering at Wisley in 1938 it was recognized as a species of *Docynia*, a genus closely related to the Pears, Quinces, and some of the Crab Apples, but as it was impossible to decide the exact species

material was sent to the Herbarium of the Royal Botanic Gardens, Kew, for determination. There it was identified as *Docynia Delavayi* (Franch.) C. K. Schn., a native of Yunnan and south-western Szechwan, China,* where according to WILSON it grows on mountain sides and will reach a height of 25 feet.

Like most of its congeners it has a chequered history as regards nomenclature. First described as *Pyrus Delavayi* by A. FRANCHET in 'Plantae Delavayanae' (1889), it was evidently introduced by Père DELAVAY or another of the French missionaries about that time, for we find it included in M. MAURICE DE VILMORIN'S catalogue (Fruticetum Vilmorinianum) of the trees and shrubs cultivated by him at Les Barres, published in 1904.

Two years later Dr. SCHNEIDER transferred it first to *Eriolobus* (now a section of *Malus*, the Crab Apples), and subsequently to DECAISNE's genus *Docynia*, where it has since remained. This name was coined in 1874, an anagram of *Cydonia*, to cover the two Himalayan species *D. Hookeriana* and *D. indica*. The latter is illustrated (as *Pyrus indica*) in Vol. II of WALLICH'S magnificent folio volumes 'Plantae Asiaticae Rariores,' where leaves, flowers, and fruit are all depicted. It clearly differs from our plant in the saw-edged leaves with no trace of hairs. The quotation from Mr. COLEBROOKE regarding the fruit is worth reprinting again here: "the fruit has an austere taste, in a less degree however than the Crab-Apple of England, with some flavour of the Quince." Evidently, therefore, like other Chinese Quinces, it may find its best use in jelly-making, and we may hope for a large enough crop in the near future to sample its qualities.

There are in all five species of *Docynia*, the three already mentioned, with *D. rufifolia* (Lévl.) Rehd. from Yunnan, south-west China, and *D. Doumeri* (Bois) C. K. Schn. from Annam.

The exact origin of the Wisley plant is now unknown, but it may have been raised from seeds collected by FORREST in China during his 1917-19 expedition. While it is not likely to prove a highly ornamental tree, the equal in flower production even of the best species of *Pyrus*, or still less of the Crab Apples, if it blooms more freely in the future it will be worth noticing in the spring before the bulk of these open their buds, and in the autumn for the curious Quince-like fruits. At all times the tiered habit of the plant draws attention, and the persistent winter foliage is another unusual feature which will puzzle even the most up-to-date of shrub collectors and connoisseurs.

As for likes and dislikes, it is probable that with most other members of the great family of Rosaceae it will show no objection to the presence of lime in the soil in one form or another—it will probably rather enjoy it—but at Wisley this constituent is lacking. In view of its southern habitat a sunny and somewhat sheltered position might be suggested, and quite probably the reason why this particular plant has been so slow to flower is that it is in a border facing north, much shaded on the south side by Oak and other trees.

* It has been collected only in these two provinces, by A. HENRY, E. H. WILSON, H. HANDEL-MAZZETTI and others, at altitudes ranging from 5,650 to 8,100 feet.

PLANTS TO WHICH AWARDS HAVE BEEN MADE IN 1940.

* *Cyclamen persicum* 'Albatross.' A.M. January 25, 1940. Raised, introduced and sent by Messrs. Blackmore & Langdon, Bath. Plant of compact robust habit, very free and continuous flowering. Flowers of good form, held erect on stiff stems well above the foliage, of good substance, white ; petals $\frac{1}{2}$ inch wide, $2\frac{1}{2}$ inches long. A good true and even stock.

Cymbidium × 'Hawfinch' var. 'Emerald.' A.M. February 20, 1940. This useful addition to the genus bore a tall spike of seven large flowers, of greenish-ivory colour, the labellum with a crimson border. The result of crossing *C.* × 'Bustard' with *C.* × *Alexanderi*. Raised and exhibited by Sir William Cooke, Bart., Wyld Court, Hampstead, Newbury, Berks.

Cymbidium × 'Ruanda' var. 'Queen of the Pinks.' A.M. February 20, 1940. A charming hybrid which bore a spike of fifteen well-set flowers of rose-pink colour, the segments having venation of a more intense colour, while the apex of the labellum has a crimson-red margin. The result of crossing *C.* × 'Redstart' and *C.* × 'Pearl.' Raised and exhibited by Messrs. J. McBean, Cooksbridge, Sussex.

Cypripedium × 'Aylesbury' var. 'Picture.' A.M. February 20, 1940. A compact flower having the broad dorsal sepal heavily marked with dark crimson spots, the expansive petals and labellum mahogany-red. The result of crossing *C.* × 'Euryostom' with *C.* × 'Everest.' Raised and exhibited by Messrs. Black & Flory.

Leptospermum scoparium var. *eximium*. From Lionel de Rothschild, Esq. This fine variety of *L. scoparium* is a Tasmanian plant introduced by Mr. H. F. Comber (No. 1508), who found it growing near Port Arthur on the Tasman Peninsula. It is a robust shrub differing from the narrow-leaved type plant in having ovate to suborbicular, silky-hairy leaves $\frac{1}{2}$ inch long, and larger, purer white flowers $\frac{1}{2}$ inch in diameter.

Odontioda × 'Saxa.' A.M. February 20, 1940. A showy hybrid which bore a spike of eight well-formed flowers of rich scarlet-red colour. The result of crossing *Oda.* × 'Memoria Pantia Ralli' with *Oda.* × 'Marie Antoinette.' Raised and exhibited by Messrs Charlesworth & Co.

Odontonia × 'Poinesta.' F.C.C. February 20, 1940. This elegant hybrid carried a spike of six large flowers, mainly of claret-red colour, the segments margined with white, the labellum having a yellow crest at the base. Raised by Messrs. Charlesworth & Co., Haywards Heath, by crossing *Odontonia* × 'Nesta' with *Odontoglossum* × 'President Poincaré,' and exhibited by H. Barnard-Hankey, Esq., East Burnham Park, Slough.

* After trial at Wisley.

THE AWARD OF GARDEN MERIT.—LIV.*

259. EUCRYPTHIA GLUTINOSA.

Award of Garden Merit, September 23, 1935.

Better known to gardeners under the name *Eucryphia pinnatifolia* Gay, this beautiful shrub cannot yet be described as common although it has been in cultivation for about eighty years. Originally discovered by GAY, in 1845 it was collected by PEARCE when travelling in Chile for Messrs. VEITCH.

The flowers are produced with great freedom in July and August; individually they measure about 2 to 3 inches across and are pure white with generous tufts of stamens and golden anthers (fig. 37). The flowers contrast splendidly with the dark, shining green of the leaves. In their young stage the leaves and shoots are hairy; the plant is hardy and is usually regarded as an evergreen, but this is not always true as in some seasons and districts it loses its leaves in varying degrees.

E. glutinosa thrives best in a neutral soil, and it should not be planted if the soil contains lime. A position where its roots are shaded from the glare of the sun is most suitable, and when happily situated it will establish itself without difficulty. The ultimate height of the tree is usually from 10 to 15 feet.

TRIAL OF HARICOT BEANS IN 1939.†

HARICOT Beans, the dried seeds of certain varieties of what is known in England as the French Bean, *Phaseolus vulgaris*, being rich in protein, constitute a valuable source of nutritious food. Types of these Beans form the raw material of such canned products as "baked Beans," "pork and Beans," etc. In order to discover whether crops of Haricot Beans could be grown successfully in this country, certain representative varieties were submitted for trial at several widely separated centres chosen to provide a full range of varying soil and climatic conditions. The varieties selected were: 'Brown Dutch,' 'Inépuisable,' 'White Leviathan,' 'Masterpiece,' 'Comtesse de Chambord,' and 'Prédome à rames,' the last a climbing type, not planted at all the centres.

* Notes on plants which have received the Award of Garden Merit have been gathered together and published with the title *Some Good Garden Plants*. This can be obtained on application to the Secretary, R.H. Society, price 4s. Additional notes appeared in the JOURNAL R.H.S., vol. 63, pp. 190, 246, 448 and 546; 64, pp. 134, 232, 290, 374 and 484; 65, pp. 60 and 97.

† Published by kind permission of the Ministry of Agriculture and Fisheries.

The following useful record of the characters of each variety has been provided by the staff at the Royal Horticultural Society's Gardens, Wisley :

Brown Dutch. Plant 15 inches tall ; pods 4 to 4½ inches long by $\frac{1}{2}$ inch wide, well above the soil ; seeds in pods up to 5, round in section, brown, often truncate at ends ; ripens well and shells easily. Ready as Haricots end of September.

Inépuisable. Also known as 'Everbearing.' Plant 16 inches tall, bearing flowers in very large clusters, well above the foliage, many of which fail to set ; pods 5 to 6 inches long by $\frac{3}{4}$ to $\frac{1}{2}$ inch wide ; seeds in pods up to 5, flattish oval, truncate, white ; ripens well and shells easily. Ready as Haricots mid-September.

White Leviathan. Also known as 'White Haricot.' Plant 18 inches tall ; pods 5 to 6½ inches long by $\frac{1}{2}$ inch wide, well above the soil ; seeds in pods up to 6, flat oval, kidney shaped, white, some with a greenish tint ; ripens well and shells easily. Ready as Haricots mid-September.

Masterpiece. Plant 16 inches tall ; pods 6 to 7 inches long by $\frac{1}{2}$ inch wide, above the soil ; seeds in pods up to 5, roundish in section, almost straight or kidney, pale dun ; ripens well and shells easily. Ready as Haricots early September.

Comtesse de Chambord. Also known as 'Dwarf White Rice.' Plant of low spreading habit, almost semi-climbing but not requiring support ; pods just above the soil, 3 to 3½ inches long, flattish oval, $\frac{1}{2}$ inch wide ; seeds in pods 3 or 5 in a pod, round oval, very small, more or less truncate, white ; ripens well and fairly easy to shell. Ready as Haricots end of September.

The trials were conducted at the following institutions :

- | | |
|--------|---|
| Centre | I. Midland Agricultural College, Sutton Bonington, Leicester. |
| | II. Horticultural Research Station, Cambridge. |
| | III. Royal Horticultural Society's Gardens, Wisley, Surrey. |
| | IV. Cannington Court Farm Institute, Somerset. |
| | V. South-Eastern Agricultural College, Wye, Kent. |
| | VI. John Innes Horticultural Institution, Merton, Surrey. |
| | Lord Wandsworth Agricultural College, Basingstoke, Hampshire. |
| | Sparsholt Farm Institute, Hampshire. |
| | Kirton Agricultural Institute, Lincolnshire. |
| | Hutton Institute of Agriculture, Lancashire. |
| | School of Agriculture, Houghall, Durham. |

It was arranged that the trials should be carried out under conditions approximating to commercial practice as nearly as possible, and accordingly at several of the centres the seeds were planted under farming conditions.

Cultivation.—The seeds were sown in May in rows 2 feet apart with a space of 1 foot between the plants. The dry conditions,

amounting to drought at some of the centres, which followed sowing and held for several weeks, interfered with germination and also affected subsequent growth. It was noted that under drought conditions some varieties, notably 'Inépuisable,' germinated less well than others. Predatory birds and animals were an added source of trouble at some centres, notably Sparsholt, where the damage was severe enough to render the trial useless. A further complication arose out of the fact that all the varieties selected for trial were affected more or less with Mosaic, a virus disease, a common trouble with French Beans.

Results.—As was anticipated, the results under such varied conditions were not uniform. Unfortunately, unforeseen difficulties were encountered at some of the centres owing to the depredations of rabbits, hares and wood pigeons which appeared to be very partial to the young growing plants and in one or two instances completely destroyed them. Crops of this character must be grown under conditions where adequate protection from damage of this kind can be afforded.

The trials were most successful at Centres Nos. I, II, III, IV, V, and VI, and although a uniform system of reporting on the trials was not originally worked out, it has been possible to compile the following statement from the data supplied by these centres :

Centre		Brown Dutch	Inépuisable	White Leviathan	Masterpiece	Comtesse de Chambord
I.	No. of Plants ..	300	300	300	300	300
	Wt. harvested ..	9 lb. 4 oz.	4 lb. 4 oz.	6 lb. 8 oz.	7 lb. 5 oz.	6 lb. 10 oz.
II.	No. of plants ..	288	296	299	291	298
	Wt. harvested ..	29 lb. 10 oz.	28 lb. 14 oz.	33 lb. 6 oz.	25 lb. 0 oz.	38 lb. 8 oz.
III.	No. of plants ..	353	369	372	449	386
	Wt. harvested ..	42 lb. 0 oz.	28 lb. 4 oz.	37 lb. 8 oz.	39 lb. 12 oz.	51 lb. 8 oz.
IV.	No. of plants ..	60	60	60	60	60
	Wt. harvested ..	1 lb. 5 oz.	2 lb. 0 oz.	3 lb. 4 oz.	2 lb. 6 oz.	3 lb. 5 oz.
V.	No. of plants ..	200	200	200	200	200
	Wt. harvested ..	9 lb. 7 oz.	6 lb. 12 oz.	12 lb. 5 oz.	9 lb. 5 oz.	13 lb. 10 oz.
VI.	No. of plants ..	20	20	20	20	20
	Wt. harvested ..	1 lb. 2½ oz.	1 lb. 5 oz.	2 lb. 2 oz.	1 lb. 6½ oz.	2 lb. 13 oz.
<i>Estimated Yield per Acre.</i>						
III.	—	18½ cwt.	16 cwt.	16 cwt.	17 cwt.	22 cwt.
VI.	—	11½ "	—	—	—	27½ "

It should be borne in mind that the weather of 1939, a cold and dry summer followed by a wet autumn, was distinctly unfavourable for this type of crop. Natural harvesting was impossible, and the crop at most centres had to be dried artificially. The cultivation of commercial crops under farm conditions would clearly have been a matter of considerable difficulty in this country.

The important factor in the production of dried Haricot Beans is the period of time which elapses between date of sowing and the maturing of the crop. It seems clear from these trials that the five varieties tested can be relied on to mature their crops during September under favourable conditions.

As regards yield, the four varieties, 'Brown Dutch,' 'Inépuisable,' 'Comtesse de Chambord' and 'Leviathan,' despite the handicap of weather and disease conditions, all yielded satisfactorily at the centres mentioned. The average yields of this type of Bean in various parts of the world when grown under farming conditions is not high and seldom exceeds 20 cwt. per acre even with the use of the most suitable varieties.

Sufficient evidence was obtained to support the view that the variety 'Comtesse de Chambord' is from several points of view, notably growth and cropping capacity, ability to withstand adverse climatic conditions, appearance of harvested sample and edible quality when cooked, particularly suitable for English conditions. The variety 'Brown Dutch' clearly occupies second place, with 'White Leviathan' and 'Inépuisable' of about equal merit.

Lastly, the production of Haricot Beans will normally be most successful in districts where fairly warm and dry conditions prevail. In short, the crop can be safely recommended for the south-eastern and southern parts of the country and parts of the Midlands. The north-eastern and northern areas should be avoided.

BOOK REVIEWS.

"Gardening in War-time." By E. Graham. 8vo. 188 pp. (Peter Davies, Ltd., London, 1940.) 4s. 6d.

This latest addition to the books on gardening in war-time is both sound and well planned so that the information it contains is readily obtainable. A chapter on re-planning the garden to meet war conditions is followed by a discussion of the tools required in the various operations, and these latter are in turn considered fully. Suitable crops to grow, drying and bottling vegetables, and notes on hard and soft fruits complete the kitchen garden section, and the two final chapters are devoted to the flower garden. An unusual feature is a list of publications of use to the war-time gardener.

"War-time Allotments, Pigs and Poultry." General Editor, C. H. Middleton. 8vo. 184 pp. (Daily Express, London, 1940.) 1s.

The war-time allotment, pig and poultry keeping are the broad headings under which this book is divided. It is written in simple language and contains a wealth of useful information for the production of more and better food.

"How to Grow Garden Food." Edited by Alfred W. Yeo. 5½ inches by 3½ inches. 55 pp. (Baskerville Press, Eastbourne, 1940.) 3d.

A handy-sized pocket guide to the routine operations of kitchen gardening for small plots and allotments. It is comprehensive, concise, and most informative.

JOURNAL OF THE ROYAL HORTICULTURAL SOCIETY

MP. 1940
4. JUN. 1
LIBRAF
Part 5

Vol. LXV



May 1940

THE SECRETARY'S PAGE.

RED CROSS SALE.

It has been decided to hold a sale on behalf of H.R.H. The Duke of Gloucester's Red Cross and St. John Fund on similar lines to that held in 1916 when over £2,500 was raised, and the following executive committee has been appointed :—

The Lord Aberconway, C.B.E., V.M.H.
F. R. S. Balfour, Esq., D.L., V.M.H.
E. A. Bowles, Esq., F.L.S., F.R.E.S., V.M.H.
The Rt. Hon. The Viscountess Byng of Vimy.
Sir Jeremiah Colman, Bt., D.L., V.M.H.
Clarence Elliott, Esq.
F. Sydney Harvey-Cant, Esq.
T. Hay, Esq., C.V.O., V.M.H.
Iris, Lady Lawrence.
G. W. Leak, Esq., V.M.H.
George Monro, Esq., C.B.E., V.M.H.
Amos Perry, Esq., V.M.H.
Lionel de Rothschild, Esq., O.B.E., V.M.H.
Sir James Slade, J.P.
O. C. A. Slocock, Esq.
Sir Charles Howell Thomas, K.C.B., K.C.M.G.
Colonel Sir Courtauld Thomson, K.B.E., C.B.
Edward White, Esq., V.M.H.

The sale will be held at the end of September in the old hall of the Society, and Fellows will be asked to support it both by gifts of plants for sale and by purchase. Notices and further information about this sale will appear monthly on this page.

The Fortnightly Meetings have been brilliant in the exhibits and have aroused great interest among the Fellows and visitors. It is reassuring to think that if continued support in visiting the shows and placing orders can be maintained by Fellows and visitors we shall be able to make a mark in the history of Horticulture that the war does not interfere with the interest in gardening.

In order to encourage greater attendance it has been decided during the summer months, as long as the black-out allows, that the shows on the first day will be open until 6.30 P.M. This will give Fellows and visitors who are employed in offices better opportunities to visit the hall and enjoy the exhibits.

The first Fortnightly Show after Whitsun will be held on May 21 (12 noon to 6.30 P.M.) and 22 (10 A.M. to 5 P.M.) and on this occasion Sewell Medal Competitions will be held for Alpine and Rock-garden Plants. Two medals are available, one for an amateur's exhibit and one for a horticultural trader's exhibit. Keener competition for these medals is particularly desirable and special facilities are given to competitors to take away their exhibits on the evening of the first day in order to encourage competition. Particulars of this competition may be had from the Secretary.

At 3 P.M. on May 21, Mr. G. Fox Wilson will lecture on "Some Seasonal Pests of Garden Vegetables and their Control" and at 3 P.M. on May 22, Mr. C. P. Raffill will talk on "Some Plants in the Show."

A Fortnightly Show will be held on June 4 (12 noon to 6.30 P.M.) and 5 (10 A.M. to 5 P.M.) at which the special feature will be Irises.

At 3 P.M. on June 4 Mr. B. R. Long will give a lecture on "Tall Bearded Irises of Yesterday and Today."

At 3 P.M. on June 5 the talk on "Some Plants in the Show" will be given by Mr. T. HAY, C.V.O., V.M.H.

The second Fortnightly Show in June will be held on June 18 (12 noon to 6.30 P.M.) and 19 (10 A.M. to 5 P.M.) and the special features at this Show will be Cacti and Succulents, Violas and Pansies. Classes for Flowering Shrubs will also be held on this occasion as follow :—

Class A.—8 varieties of hardy shrubs in bloom, not more than 2 of any one genus.

First prize, £3 ; Second, £2 5s. ; Third, £1 10s.

Class B.—1 vase of a hardy shrub in bloom.

First prize, £1 ; Second, 15s. ; Third, 10s.

At 3 P.M. on June 18 Mrs. Frances Perry will lecture on "Water Plants and Water Gardens."

At 3 P.M. on June 19 a lecture will be held under the auspices of the Institute of Landscape Architects, and Fellows are invited to attend.

PRACTICAL DEMONSTRATION AT WISLEY.

On June 6 and 7, from 2 P.M. to 4 P.M., there will be a demonstration, weather permitting, on the Summer Pruning of Shrubs. In order that

the arrangements may be made, those Fellows desiring to attend the demonstration should notify the Director of the Gardens beforehand.

EXAMINATIONS.

The practical portion of the Teachers' Examination in School and Cottage Gardening will take place on June 6 at Wisley.

The Preliminary Practical Examination for the National Diploma in Horticulture will take place at Wisley from June 10 to 14, and the Final Practical Examination for this Diploma will take place at Wisley from June 17 to 20.

THE LILY GROUP.

A Question and Answer Meeting will be held by the Lily Group in the Restaurant of the Old Hall in Vincent Square, at 4 P.M. on Tuesday, June 18. Fellows who are not members of the Group are invited to attend.

BEE-KEEPING.

For Fellows interested in bee-keeping it is understood that Mrs. M. E. Craddock, the Surrey Agricultural Committee's Bee-keeping Instructress, gives demonstrations and lectures on bee-keeping throughout the summer at the Apiaries at Clandon and Holmwood. Fellows interested in bee-keeping may apply direct to her at "Oakhurst," Woodham Rise, Woking, Surrey.

PANEL OF LECTURERS.

Many lectures have been asked for from the panel of lecturers, and with the coming summer it is thought that probably many Affiliated Societies would like to ask for demonstrations in small gardens and allotments. The application for making use of the Society's panel of lecturers applies equally well for demonstrators. In many of the larger cities under the Park Superintendent, demonstration plots are provided, and demonstrations are being given weekly.

THE PETER BARR MEMORIAL CUP.

The Peter Barr Memorial Cup, which is awarded annually to someone who has done good work of some kind in connexion with Daffodils, was, on April 2, unanimously awarded to Mr. W. Slinger for his work as a raiser and exhibitor of Daffodils.

THE LINDLEY LIBRARY.

It is gratifying to report that the suggestion made in the March JOURNAL has been accepted by many visitors, viz. that application for books to be studied in the Library may be made in writing so that the Assistant Librarian can prepare them should they call at the Library at a time when he himself is unable to be present.

PESTS AND DISEASES OF VEGETABLES.

An invaluable bulletin (Number 2 of the "Growmore" series) has just been issued by the Ministry of Agriculture and Fisheries and is obtainable from H.M. Stationery Office and all booksellers, price 6d. (postage extra). It deals in a concise and simple form with various measures of control, preparation of insecticides and fungicides, the apparatus required for their application, and then proceeds to describe in detail the pests and diseases of each particular crop that the gardener is recommended to grow as a war-time measure. To facilitate the recognition of the various pests and diseases, four pages of photographs are included. A companion to these two "Growmore" bulletins, dealing with the simple cooking of vegetables, is now in course of preparation and will be published shortly by the Society.

WISLEY IN MAY.

WITH the last month of spring and commencement of summer the Gardens come to one of the most flowery and attractive periods of the year, especially in the Rock garden and shrub collections, where many of the principal groups such as Primulas and Saxifrages, Lilacs and Crab-Apples are at the height of their beauty.

Visiting first the greenhouses and going into the Half-Hardy house we notice on the right the dwarf, compact *Acacia pulchella*, with tiny leaves and clusters of golden-yellow flowers, the rich purple-blue *Babiana disticha* at the foot of the rock-work, the Barberton Daisy (*Gerbera Jamesonii*) in salmon-pink or buff, on the opposite side the shrubby *Ebenus cretica*, with spikes of deep pink Lupin-like flowers set off by grey foliage, and at the further end the charming lavender helmets of *Calceolaria violacea*, unfortunately not hardy outside at Wisley. In the second house zonal Pelargoniums, following Cinerarias, are likely to form the chief feature.

Some of the most notable plants in the Temperate house, such as the Acacias, Camellias, Ericas, and Epacries, will have passed out of flower by the beginning of this month, but to take their place we find several Fuchsia species (*F. corymbiflora* and *F. serratifolia* in particular), Clivias, tender Rhododendrons, including the lovely salmon-coloured 'Lady Chamberlain,' the Bird-of-Paradise flower, *Strelitzia Reginae*, and the red blooms of *Macleania insignis* and *Pentapterygium serpens*.

It will be worth while walking up to the Alpine house by way of the main avenue (King's Avenue) which traverses the hillside between the Rose borders, in order to see the Japanese Cherry collection, which, during the earlier part of the month at least, is in bloom here and in Seven Acres, the latter area containing older plants but in lesser variety.

In the Alpine house are very many plants to interest those who cultivate this fascinating group; they are too numerous to mention in detail, but include the later species of *Saxifraga* such as *S. Grisebachii*,

Androsaces, *Primula redolens*, *Daphne Genkwa* and *D. rupestris*, *Fritillarias*, *Penstemon Newberryi*, *Polygala Vayredae* with crimson-winged Pea-shaped flowers, and various species of *Dianthus*, *Lewisia*, and *Phlox* which continue flowering into June. In the adjacent beds or frames is the collection of *Aubrietas*, of *Tulipa* species, where *T. Hageri* and *T. Orphanidea* with their copper-hued flowers open later in the month, and *Irises*, including the curiously tinted *I. Sari* from Turkey and forms of the dwarf *I. Chamaeiris* planted among the *Helianthemum* collection. The latter and the majority of the *Cistus*, it should be mentioned, suffered severely during the winter and are not likely to be as good as usual in June.

The Rock garden is a gay place just now and for the next few weeks, with suitable plants and dwarf shrubs flowering successively in the many crevices and corners it contains for their enjoyment. Some of them are the forms of *Androsace sarmentosa*, with pink heads of flowers held up on short, wiry stems, species of *Primula*, including *P. Sieboldii* and the white *P. chionantha* in the Bog garden and later the fragrant lavender *P. nutans*, one of the most beautiful of this large family. The mauve *Ramondia Myconii* (*pyrenaica*) will be found on a rock bank towards the bottom of the slope, and near the top the double King-Cup *Caltha palustris* var. *plena* is mirrored in the water, while *Cytisus kewensis*, so profuse with its creamy flowers, is in bloom close by. The dwarf Rhododendrons form an indispensable group of small shrubs for those who have no lime in their soil, and at Wisley thrive in shady corners at the top of the alpine meadow and at the western end beside the Bog garden. In both these places a variety of species is represented which covers a long period of flowering. An exceedingly pretty Daffodil is in bloom now, the hybrid 'Hawera,' raised in New Zealand, bearing clusters of creamy-yellow flowers in the shape of *N. Triandrus* but on taller stems. The pink, sub-shrubby Aethionemas are usually an attractive sight just now, and two noteworthy shrubs are *Daphne tangutica* and the prostrate *D. Blagayana*.

Continuing down into the Wild garden the Rhododendrons and earlier Azaleas will be in bloom, if the severe frosts experienced have not damaged the buds during the winter, as may be the case with some varieties; Rhododendrons include the several forms of *R. obtusum* and its hybrids, together with the white *R. mucronatum*, *R. decorum* with wide-open, fragrant flowers, and the dwarf, plum-coloured *R. campylogynum*, most suitable for the rock garden. Of Primulas, *P. denticulata* will probably still be flowering on the ditch side adjoining Seven Acres (fig. 42), and beneath the Oak trees are plantings of *P. japonica*, *P. 'Red Hugh'*, the yellow *P. helodoxa*, and *P. pulverulenta* with mealy stems and whorls of crimson flowers. That handsome tree from California, *Arbutus Menziesii*, is now producing panicles of white flowers at the ends of the branches, but is also well worth planting for the beauty of the red-brown bark and trunk.

Most of the large specimens of the tree Heaths have suffered severely during the winter, but *E. arborea alpina* (fig. 44) will doubtless be

loaded with fragrant flowers, a Mecca for bees ; with its grass-green foliage and cast-iron hardiness this is indeed a shrub which should be most widely grown. In the Heath garden, too, will be found some of the Brooms (*Cytisus*) such as the white *C. multiflorus (albus)*, the early *C. purgans* and its hybrid offspring *C. praecox*, with creamy-white, unpleasantly scented flowers.

As we have already noted, the Crab-Apples and Japanese Cherries will be the principal trees flowering in Seven Acres, and of both there is a wide selection to be seen. The Pearl Bushes (*Exochorda* species), Spiraeas, including *S. arguta*, *S. canescens*, and others, with the earliest species of *Berberis*, *Cotoneaster*, and *Pyracantha* towards the end of the month will all help to brighten and lend interest to this part of the Gardens.

From now onwards for some weeks it will be worth the extra walk through the Pinetum or along the river bank to see the various features of late spring and early summer as they gradually come into flower in Howard's Field.

In May there are the Lilacs, a very large and comprehensive collection, including all the best-known sorts, hybrids and species less frequently seen. Here also is a small collection of the newer Brooms, coloured forms of *Cytisus scoparius*, and in the latter part of the month the first of the large number of Rosa species gathered here will be in flower—pale yellow *R. Hugonis*, *R. omeiensis* and its several forms, and varieties and hybrids (fig. 43) of the Scotch Rosa, *R. spinosissima*, including the handsome, large-flowered variety *altaica*.

Returning by the opposite route to the outward walk we can visit the Award of Merit garden near the round pond, where are good specimens of some first-rate garden plants, including a large bush of *Berberis stenophylla*, the upright Japanese Cherry—'Ama-no-gawa,' *Syringa 'Vestale'*, one of the best white Lilacs, and that ornamental hybrid Crab-Apple, *Malus Eleyi*, with rose-purple flowers, to be followed in the early autumn by equally decorative fruits. The beautiful specimen of *Prunus subhirtella pendula* (fig. 45) should still be in full beauty—one of the most attractive trees in the gardens.

THE KITCHEN GARDEN IN MAY.

MAY is a busy month among the vegetables, and much routine work of thinning and hoeing should be done if the crops are to be up to expectations. Year after year the advice to thin seedlings early is ignored by many gardeners, with the result that the young plants lose their sturdiness and never recover from the short period of suffocation by their neighbours. Once the far-reaching effects of tardy thinning are realized the gardener will see to it that no delay is permitted, even if other work has to take second place. At the same time weather conditions sometimes inevitably delay the work, since with many plants it is courting disaster to thin during hot, dry spells. If such weather should arrive at the critical time, advantage should be taken of every shower, or the work should be done during the evening and the remaining seedlings given a watering. With most crops a preliminary thinning should be done, leaving double the number of plants required, followed by a final thinning after an interval of a week or ten days.

The familiar exhortations to make full use of the hoe may well bear repeating; after thinning a crop a light stirring of the surrounding soil is desirable, and if, as soon as it is possible, a regular hoeing routine is started, say covering the ground once in every ten or fourteen days, the better will be the health of the crops and the less serious the competition of weeds.

The earthing up of Potatos should be carried out as various batches become ready. Brussels Sprouts, Cabbages and Cauliflowers that have been raised in frames should be planted out during the month, and, if the ground has not already been prepared for Celery and Leeks, this work should be put in hand at once. The earliest Celery plants may be planted out at the end of the month in most districts if the weather is suitable. Early in the month Marrows and Ridge Cucumbers may be sown in small pots in cold frames to provide plants for planting out in June. Where facilities for raising under glass do not exist, seeds of Marrows and outdoor Cucumbers may be sown outside towards the end of the month, provided the weather is suitable. Runner Beans may also be sown during the month, and it will be found convenient to sow them in double rows, 9 inches apart, leaving about a foot between each seed. A sowing of French Beans may be made early in May and repeated towards the end of the month, and if seeds are still obtainable it will be a wise precaution to sow a few rows of Haricot Beans, such as the variety 'Comtesse de Chambord,' which would be valuable for winter use. Those interested may refer for further particulars about Haricot Beans to the report of the Trial, published on p. 123 of the April issue of the JOURNAL. Those who have to garden on very light soil and find difficulty in maintaining a supply of Spinach may sow a few rows from the middle of May onwards of the New Zealand Spinach, which forms an excellent substitute. Further

sowings of late Peas may be made on well-prepared ground at fortnightly intervals, and small regular sowings of Carrots and Beet, together with Lettuces and other salad vegetables, should be made to maintain a constant supply of fresh vegetables.

The beginning of this month is a good time to bark-ring strong-growing Apples and Pears, as the sap is rising freely at this period, allowing the bark to part easily and cleanly from the wood. The object of bark-ring ing is to check excessive growth by temporarily stopping the downward flow of elaborated sap to the roots ; this elaborated sap is therefore used to stimulate fruit-bud formation. The operation is simple. On the main stem of the tree, about 6 inches below the lowest branch, remove a complete strip of bark. The strip must not exceed a quarter of an inch in width, and it is taken out right down to the wood, but care must be taken not to injure the wood. Cover the wound immediately with grafting wax or adhesive tape to prevent the entry of disease spores. It is not advisable to bark-ring stone fruits.

As soon as the first Strawberry flowers open, the bed must be strawed or "littered" to prevent the subsequent fruits from being covered with grit. Wheat or Oat straw is best. Cut the straw truss into three to make it easier to handle and tuck well under the foliage of each plant to form a mat on which the berries can rest. As soon as the first fruit has set, net the bed.

Keep all "spawn" or suckers removed from the rows of established Raspberries unless the suckers are required for making a new row in the winter ; weak and overcrowding shoots are removed from each stool, retaining seven or eight of the strongest and best placed. Thin out overcrowding shoots from the row of autumn-fruited Raspberries. Apply a good mulch of well-decayed farmyard manure to both summer and autumn fruiting kinds.

As soon as the flower petals have fallen from the Apples and Pears spray with lime sulphur at 1 in 100 to control Apple and Pear Scab. At the first sign of caterpillars or aphides (green-fly) spray respectively with lead arsenate and nicotine ; both these materials are poisonous to man and must be handled with care ; a non-poisonous Derris or Pyrethrum wash may be used instead.

In the early viney continue to thin the bunches as necessary and, as soon as the berries commence to colour, assist this function by providing more air during suitable weather ; free circulation of warm air is essential during this period, particularly with varieties such as 'Madresfield Court,' which is liable to skin-cracking unless care in airing is taken. As soon as the varieties in the late vineyries have set, remove surplus bunches, the number of bunches retained depending on the vigour of the rod. Overcropping does not pay. As soon as possible commence thinning the berries, as the late varieties swell quickly and, if left until later, thinning is difficult. Give a periodical feed with liquid manure and water when necessary. Damp down in the morning and evening.

PLANTS TO COME.

By F. KINGDON WARD.

HE would be a bold, nay, a reckless man who would wager his patrimony that our gardens have attained the highest possible summit of beauty and diversity ; that the best, the most exquisite flowers from the last lost niches of the world have already been discovered ; and that henceforth we shall have much ado to keep our gardens up to their present standard, lest they begin to go down hill.

True, the all-rounders, those plants which, having grace, beauty, and a charm of personality (like some rare human beings), are at the same time easy to grow, cannot be surpassed. They, at least, need not fear that the day will ever come when they will sadly say :

“ Yesterday's flowers are we ! ”

For gardeners will see to it that they, at least, get old-age pensions.

But even these rare spirits may have peers, and there is always a subtle if slightly vulgar joy in novelty which urges us forward to fresh fields. If there are none better than the twice chosen, there are perhaps others as good. History may record that professional plant hunting reached its zenith during the first quarter of the twentieth century, and it is at least unlikely that such a continuous stream of first class hardy plants will ever flow again for so long a period, either from the East or anywhere else. The supply is not inexhaustible. It may be that the ten or fifteen thousand hardy plants cultivated in this country represent a large majority, and that there are not many more to come, at least not in the highest categories.

It may be that nothing so unforeseen as *Meconopsis betonicifolia*, so dynamic as *Rhododendron repens*, so magnificent as *Lilium regale* will ever be discovered again.

But this is not the view of plant explorers themselves. Cold calculation suggests, on the contrary, that if there are not quite so many good fish in the sea of vegetation as have come out of it, there are plenty left. Arguing from experience, from analogy, and from some knowledge of how much of the world is really explored, I would take long odds that there are still many scores of good garden plants awaiting, like the sleeping beauty, the touch of some fairy prince, or, more prosaically, of some hard-headed and hard-boiled plant hunter to awaken them.

But that we shall acquire them in the near future I think very unlikely. It is not simply that they are rarer, more remote, and more difficult of access than the plants we already have in cultivation. Much more is it that all over Asia, in Iran, in Tibet, in China, in Thai, the blinds are being drawn, and science is being put to sleep—under a great show of patriotic awakening. For in this age, nationalism has

prevailed ; it has conquered science, so that science is no longer international ; and here I include exploration in the field, which cannot flourish in an atmosphere of suspicion and mutual jealousy. We may not be able to resume plant hunting in some of the most promising regions of the world for fifty or a hundred years. But let us not anticipate a total eclipse. When to the unknown plants are added those known to a few specialists but never yet brought into cultivation, and those which were once in cultivation but have since been lost, it will be realised that there is plenty of fresh material for gardeners to try their skill on in the future. Perhaps Shakespeare was thinking of plants when he wrote :

“ Past and to come seem best,
Things present, worst.”

My interest in the subject of plants to come was quickened by reading Mr. THOMAS HAY's Sit Down and Travel stories of lost garden plants which appeared in three issues of Gardening Illustrated some years ago.

I ceased to speculate—with the aid of blank map sheets more eloquent than silence itself—on what might be unknown, to concentrate on what *is* known ; and have been invited to describe a few plants whose existence in nature is vouched for by a mummy plant in a herbarium, so that at least one collector must have seen the plant alive, and anybody can see it dead. Thus I have endeavoured to carry Mr. HAY's story a step forward. He dealt with garden plants which had actually been in cultivation for a longer or shorter period, but had subsequently been lost, or had gone out of fashion, so that the present generation knows them not. I have confined my attention to plants which never have been in cultivation. Nor are these mere travellers' tales of the wonders they have seen but could not collect (there seems to be a yarn in that too !), but the genuine article. Each plant is authenticated by a name attached to excellent herbarium specimens, often reinforced by illustrations of the living plant ; from which evidence one may judge they would be welcome additions to our parks and gardens. They are mummies awaiting the resurrection.

From a lengthening list of such plants, which I am compiling, I have selected a few at random, representative of various regions of the world where we have been wont to seek our hardy plants in the past. The only qualifications I have admitted are that the plants must be worth while, and that they must have a reasonable expectation, as the actuaries say, of hardiness.

As to hardiness and congenital sickliness, these are qualities of whose incidence we really know very little. There is no known formula. Trial and error is still the ultimate test. All plants are hardy under certain conditions, and most plants are miffy under diametrically opposite conditions, although there are a number of cosmopolitan weeds which would defy the devil ! But when the conditions are fixed in advance, or as fixed as anything can be in an uncertain world, our

ignorance of plant life is still such as to leave us in doubt whether a given plant will prove hardy or not. It does not wear its constitution on its sleeve so to speak ; the physiological basis of hardiness finds no morphological expression that we can recognise.

But analogy helps. If a plant belongs to a genus notorious for its robust constitution, and lives in a community, several members of which are known to be hardy, our unknown at least starts odds on. And *vice versa*.

I have tried to make this collection representative of the whole world whence our temperate plants are drawn, from China to Peru ; so it does not much matter where I start. Let me therefore start on what is my home ground so to speak, in the eastern Himalayan region, with :

Vaccinium modestum W. W. Sm.—It can be said of few plants, certainly of few exclusively rock plants, that it is uncertain whether they are more charming in bloom or in fruit. But it can be said of *Vaccinium modestum*.

To find this local rather than rare species, we must ascend an alpine rock scupper, over which a constant film of water passes like a moving membrane, in the July deluge of northern Burma. Here, where creeping Rhododendrons erupt in volcanic red fissures and hang over the ledges in curtains of fire, you may find large colonies of the Vaccinium, illuminated with little pink Japanese lanterns, as it were. On these steep pitches, so precipitous that a firm hand is as needful as a sure foot, the crowded leafy stems rising an inch or two above the thin network of rhizomes, and hung from each a solitary flower, like an inverted bowl of pink parchment, give an effect of twinkling lanterns lit by farthing dips. That is the summer aspect and a pleasing one.

By October each lantern flower has been replaced by a globular bluish-violet berry coated with an almost phosphorescent bloom, so large and heavy that it bows the weak stem and hangs clear over the slope. The small half-morocco leaves meanwhile have turned a rich wine-red, and the big glaucous drops thickly scattered among the leaves have the effect of precious stones nestling in folds of red cloth.

Conditions which will suit plants like *Primula Agleniana* and some of the dwarf Rhododendrons, which grow in the ever-spongy alpine turf, irrigated from melting snow for five months and buried under it for seven months, would suit *V. modestum*, a plant of far northern Burma, and of the Tsangpo gorge in Tibet. The original description is in Edinburgh Botanic Garden Notes, viii, 210, 1914.

Laccopetalum giganteum.—Let us cross the world faster even than "The Clipper" can carry us, flying in thought to the Andes of Peru, where giant Buttercups grow.

Ranunculus Lyallii from New Zealand has made us familiar with plants of this type ; but although our *Laccopetalum* was at first called *Ranunculus giganteus* it bears very little outward resemblance to *R. Lyallii*, and considerable resemblance—in its flowers only—to *Nuphar lutea*, the English yellow Water Lily. Fat-petalled and sternly

handsome as the flowers are, the tall sleek leaves look even more attractive ; they are narrowly lance-shaped, fleshy, with finely crenate margin, about 70 centimetres tall, twice the height of the single-flowered scape. The flowers are greenish, sometimes tinged with red, and 10 to 15 centimetres broad, the petals 8 to 10 centimetres long.

This plant and *Ranunculus Raimondii* (*Krapfia Raimondii*), with which it has been confused, were both discovered in 1904 in the Peruvian Andes, at an altitude of about 13,000 feet, inhabiting moist often limestone grasslands, and flowering in June. There is a drawing of *Laccopetalum* in ENGLER'S *Botanische Jahrbücher*, 1906 (fig. 39), from which I conclude that it—and presumably the *Krapfia*—would be an ornament to the garden. I have not seen a dried specimen, but the description endorses the belief. But near-equatorial plants, from however high an altitude, are notoriously awkward customers ; we have not yet learnt the trick of them.

Arctomecon californicum Torr. et Frém.—California, that home of large flowered, brightly coloured Poppies, has whetted our appetites with the above-named beauty which, though discovered eighty-six years ago, has never been seen in cultivation, at least not in this country. I say this without much fear of contradiction, in spite of ROBINSON'S guarded reference to it : “A North American plant of the Poppy family, but of which little is known in cultivation” (The English Flower Garden, 1883). He might as well have been downright and written “nothing is known.”

Although ASA GRAY, writing in the *Garden* (1877), speaks of “this exceedingly rare plant,” there are three good specimens, collected by as many American collectors, in the herbarium of the Natural History Museum. From these one can see how attractive the plant is. The crowded almost Ginkgo-shaped leaves, with deeply toothed margin, bunched into a thick penwiper at the base of the stem, are covered with long, shaggy, pale golden hairs which gleam even on the dried mummy. The stem, 12 to 15 inches tall, ends in an umbellate cluster of large white or, more commonly, pale yellow flowers, of which the petals are persistent—a rare feature in the family (fig. 38). The silky leaves utter a warning to the cultivator, as also does the long tap root.

FRÉMONT, who discovered the plant in 1844, writes : “This remarkable plant was found in only a single station in the Californian mountains on the banks of a creek, flowering early in May.” (Frémont's First and Second Expeditions, 1842–43–44. There is an illustration which gives a good idea of the plant.)

Of its rarity there can be no doubt ; but the extension of its habitat south-eastwards to Nevada by modern collectors shows that it is not yet extinct. Las Vegas in the dry region south of Death Valley seems to be a happy hunting-ground, and since Mrs. K. BRANDEGEE, in 1917, found it “in gypsum clay along the railroad west of town” it may even be increasing.

There seems no particular reason why, like *Romneya* and other Californian plants, *Arctomecon* should not grow in this country.

But South Africa, the Mediterranean, and other sunnier lands should suit it better. Why not plant it along the banks of the Suez Canal? One or two other species of *Arctomecon* have been described, or at any rate named, but their validity is not above suspicion; the genus—founded by TORREY on FRÉMONT's first discovery of *A. californicum*—may be monotypic.

Rhododendron Devriesianum Kds.—Now let us take another flight back to the Old World, this time to New Guinea, that ever mysterious island in the East Indian Archipelago. Rhododendron enthusiasts still sigh in vain for *R. Devriesianum*, that beautiful plant discovered in the Arfak mountains of Dutch New Guinea by the intrepid Miss L. S. GIBBS in 1913.

She described it as a shrub about 6 feet high having "magnificent white flowers, pink when older" and as growing on the edges of forest clearings at 7,000 feet, flowering in December. Magnificent is the word, judging from the corpse I have seen (fig. 41).

Its hardiness is questionable, but I cannot refrain from including so beautiful and elusive a member of a hardy genus here.

Like most if not all the Malaysian species, *R. Devriesianum* is characterised by a long narrow tube expanding suddenly into a broad trumpet. It also possesses the typical thin cylindric capsule narrowing gradually into the long style capped by a lobulate stigma. The total length of the flower is 5 inches, of which the tube alone accounts for 3; and the trumpet shaped mouth is 4 to 5 inches across. In one respect at any rate the plant is unusual. All the other Malaysian Rhododendrons I have seen, including such well-known species as *R. javanicum*, have lepidote leaves. *R. Devriesianum* has the under leaf surface covered with close set tiny rods, or papillae. Without microscopical examination it is impossible to say whether these are the bases of hairs which have broken off, or what; but at least they are not scales.

One can imagine with what awe the explorer, after weeks of toil, climbing the slippery narrow jungle paths of the densely forested Arfak mountains, in mist and rain, ever haunted by the thought that the New Guinea savages might in the end desert her, stood before this astonishing shrub in full bloom. It only remains for a worthy successor to return to the one locality on earth where it grows, and collect seed of it.

Veronica lanuginosa Bentham.—Now let us return to the Himalayas, that vast storehouse of hardy alpines from which alone I could find ample material to fill this article.

For the last thousand feet up to the top of the Tulung La, a pass over the Assam Himalayas between India and Tibet, 17,250 feet high, the path rises diagonally up a scree which is almost completely bare of plant life. Nevertheless it was when crossing it in June 1935 that, near the top, I saw, crouching under a big rock, the short dazzling electric blue spire, rising from a rosette of woolly white leaves, which was *Veronica lanuginosa*. I thought: "What a gem of a rock plant,"

and collected but one specimen from the clump, leaving the rest for seed. It was the only time I ever came across the plant, which is probably rare. When I recrossed the pass in October, not a vestige of it remained, the Tibetan wind had shaved every living thing down to ground level.

Veronica lanuginosa has been known to that impersonal goddess Science for seventy years at least, but no picture of it is known. Neither HOOKER, nor WALLICH, nor any other of the Himalayan botanists have painted it ; perhaps because the illustrating of alpine and rock plants was hardly known in their day.

HOOKER, in his restrained way, deigns not even to give it that faint praise said to lead most surely to damnation, in the Flora of British India ; but soberly describes the flowers as "small, amongst the upper bracteal leaves." He then goes on to say that the flowers are half an inch in diameter, which is surely plenty large enough for a *Veronica* ! Many of our most cherished species, which make so brave a show on the rock garden in summer, have flowers much smaller than that !

When he waxed enthusiastic about a plant, such as *Rhododendron Dalhousiae*, or *Magnolia Campbellii*, HOOKER could let himself go ; but he rarely if ever did so over an alpine herb, particularly in the Flora of British India, where he is most sparing of horticultural praise. (He goes so far as to say of *Primula* (now *Omphalogramma*) *Elwesiana* : "A very remarkable and beautiful species.")

Consequently the beauty of this brilliant little rock plant is unknown to the world, and wastes its incandescence on the desert air. It might or might not prove an easy plant to cultivate ; the very furry cloak in which it muffles itself against the high altitude gales suggests that it may be temperamental.

But of its desirability there can be no question. My own field note, written on the spot, says : "Flowers brilliant sapphire blue, crowded at the ends of the erect stems. Leaves silvery pubescent. In small clumps in the shelter of a rock . . ." These stems are from 1 to 3 inches tall, and the dried specimens show the flowers to be singularly large, in fact, as large as or larger than the leaves, and of curious shape. The numerous thin roots which spring from the rootstock are a foot or more in length.

Gentiana setulifolia Marquand.—This beautiful species, of which no seed has ever been sent home, is figured and described by MARQUAND in HOOKER's *Icônes* (t. 3162), where he says of it, "unique in the genus in having cilia on the margins of the leaves and calyx lobes." It is allied to *G. heptaphylla*, which, with the other species of the verticillate leaved series of section 'Frigida,' come from western China.

The illustration, and still more the herbarium specimen of this plant, show how desirable it is ; unfortunately, if not rare, it is certainly extremely local, and I have only met with it in one locality on the confines of north Burma, bordering on Tibet. It grows on the turf slopes at about 12,000 feet altitude, flowering in September and October, the rather narrow tubular flowers of a fine deep blue colour

The short erect stems are so closely beset with narrow almost needle-like leaves as to give a mossy or *Lycopodium* effect. (Fig. 40.)

I discovered this species in 1926, and the fact that it has never again been met with by any explorer suggests that it may be rare. But there is plenty of unexplored territory in north Burma where it may yet be found. There is no reason why it should not prove as amenable to cultivation as other species of section 'Frigida,' and it is certainly a desirable plant, of singular appearance and great charm. I still retain a vivid mental picture of a clump of it, seen during a slashing rain storm as I was climbing up, rather exhausted after a long day, to the Diphuk La, a pass over 14,000 feet between Burma and Tibet.

Limonium insigne (Coss) (*Statice insignis* O.K.).—This unusual looking sea lavender, discovered by M. BOURGEAU in 1851, and illustrated in colour in MORITZ WILLKOMM's *Illustrationes Florae Hispaniae* looks a very desirable rock garden plant. The uncommon peach-red or apricot colour of the flowers suggests anything but the sea—or lavender; but it does suggest the hot dry steppes of southern Spain, and aridity. It seems curious that rock gardeners have not yet brought this attractive species into cultivation. Even if seeds are hard to come by—and the plant flowers in April or May, so that ripe seed should be available in early autumn—it ought to be possible to transport living plants from Granada with the present resources of civilisation.

There is something rather papery looking about the common British sea lavender, an everlastingness which suggests cheap restaurants. Despite its astonishing colour, our plant still looks not only papery, but waste-papery.

But I suspect that beneath the high escarpments of the Sierra Nevada above Almeria, overlooking the Mediterranean, "cette espèce élégante, l'une des plus belles du genre," as M. WILLKOMM writes, blushes charmingly against the deep blue sea.

It grows "exclusivement dans les terrains salés des steppes arides brûlées par le soleil"; so we might have some difficulty in fulfilling its requirements in this country, at least in normal years. But you never can tell!

Careful search would reveal many more first class plants hiding their light in the botanical mausoleums of this world, while awaiting a glorious resurrection in another; and careful organisation might bring them to us alive, with a minimum of trouble.

There are over thirty thousand potential plant hunters in the Royal Horticultural Society, and it is open to any one of them to blossom into a kinetic plant hunter with at least one first class hardy plant to his or her credit. Nor is it necessary to make long and expensive trips abroad to do this. All that is necessary is a little trouble, a little patience, and a little imagination.

Most of us have friends or relations overseas close to one or other of the principal hardy plant reservoirs of the world. It is only necessary

to search out the desired plant—one comes across them by chance in old botanical books, in the herbarium, or in the course of conversation with travellers—write a description of it, not omitting such vital information as where it grows and when it flowers, and send it to the man on (or near) the spot, with a request that he will gather ripe seed of it. The rest may be safely left to him. If he is accustomed to travel, as a missionary, trader, or magistrate, he may go in search of it himself ; if his occupation is more sedentary, he may pass on the information to native friends, or send a servant to collect it. In this connection, something more than a verbal description of the wanted plant—a sketch, or even a print if such is available, may prove invaluable. Unless one can describe a plant with some accuracy, and unless your correspondent is himself something of a botanist, a picture or sketch of the plant, preferably in colour, is almost essential to avoid disappointment. And while on the subject of accurate description, one last word of warning.

Be precise. It is not enough to say you are quite certain the plant grows in China. You may be right. But to ask a correspondent who lives in Peking to send you seed of a plant which inhabits the country round Tatsien-lu is, to say the least, tactless !

THE HERB GARDEN.

By LADY HALL.

No household can be regarded as complete unless the garden contains a plot for herbs. It need not be large—a rod is ample for any but a large establishment—but it should be furnished with several plants not too generally seen in English gardens, and there should be proper liaison between gardener and cook, so that the latter can have no excuse for being restricted in her flavourings to Parsley, Mint and Sage. Nor need soil and situation be of the best, provided the ground is clean and exposed to the sun, since aromatic plants do not develop their full flavour if they are rankly grown in rich soil.

Most of the plants of the herb garden are propagated from cuttings, usually begged from some friendly neighbour, but one or two are raised from seed, as indeed all of them can be, while Shallots and Chives are planted as bulbils taken from an old stock.

The indispensable inhabitants of the herb garden are : Parsley, seed ; Chervil, seed ; Thyme, cuttings ; Marjoram, cuttings ; Tarragon, cuttings ; Sage, cuttings ; Mint, cuttings ; Sorrel, seed ; Shallots bulbils ; Chives, bulbils ; to which should be added single plants in any odd corner of Fennel and Borage. Perhaps at the head of the list should have been placed a bush of Laurel,* but a Laurel of decent size

* The Bay or Noble Laurel, *Laurus nobilis*, not the all-pervading weed, the Cherry Laurel, which so generally usurps the title of Laurel.

EXTRACTS FROM THE PROCEEDINGS OF THE ROYAL HORTICULTURAL SOCIETY.

GENERAL MEETINGS.

MARCH 5, 1940.

A lecture was given by Dr. H. V. TAYLOR, O.B.E., V.M.H. on "Food from the Garden." Chairman, The Lord ABERCONWAY, C.B.E., V.M.H.

SCIENTIFIC COMMITTEE.—Mr. E. A. BOWLES, M.A., F.L.S., V.M.H., in the Chair, and six other members present.

Abies Georgei.—Mr. Jackson showed ripe cones of *Abies Georgei* which had fruited for the first time in Britain in 1939 in Messrs. Hillier's nursery, Winchester. The cylindrical cones are about 3½ to 4 inches long, and 1½ inch wide, blackish-brown, and show the acuminate tips of the long-exserted bracts. The dense, flat foliage, deep green above and very glaucous beneath, often bifid at the apex, recalls *A. Forrestii*, but the shoots are distinctly hairy. *A. Georgei* was named after George Forrest, who collected seed in W. China.

Yucca concava.—Mr. Bowles showed foliage and a section of the very short stem of the rare *Yucca concava* from his garden. The rosette dies after flowering, but side growths are produced at the base, perpetuating the plant.

Anemone hupehensis.—Mr. Bowles also showed a fruiting spray of *Anemone hupehensis* from his garden to draw attention to the numerous hairy seeds produced which remain for some time and form a very fluffy head.

Seeds of Phytelephas macrocarpa.—Dr. Tincker showed seeds of the Ivory Nut Palm, *Phytelephas macrocarpa*.

FRUIT AND VEGETABLE COMMITTEE.—Mr. F. A. SECRETT, V.M.H., in the Chair, and eleven other members present.

Exhibit.

Mr. A. Wallace, Tudor Cottage, Wormley, Hoddesdon, Herts: Seedling Apple.

FLORAL COMMITTEE A.—Mr. G. W. Leak, V.M.H., in the Chair, and fourteen other members present.

Awards Recommended :—

Silver Banksian Medal.

To Messrs. Allwood Bros., Haywards Heath, for Carnations.

To Messrs. R. H. Bath, Ltd., Wisbech, for Hyacinths, Daffodils, Tulips, etc.

Flora Medal.

To Mr. G. H. Dalrymple, Bartley, for Freesias.

To Messrs. C. Engelmann, Ltd., Saffron Walden, for Carnations, *Euphorbia pulcherrima*, etc.

Banksian Medal.

To Messrs. H. Prins, Ltd., Wisbech, for Hyacinths.

To Messrs. Wakeley Bros., & Co., Ltd., London, for Hyacinths, Daffodils and Crocuses.

Selected for trial at Wisley.

Primula sinensis stellata 'Guardsman,' from Messrs. Sutton & Sons, Ltd., Reading.

Award Recommended after trial at Wisley :—

Award of Merit.

To *Primula sinensis* 'Scarlet King,' from Messrs. Sutton & Sons, Ltd. See p. 152.

Other Exhibit.

The Stuart Low Co., Enfield : Carnations.

Primula malacoides 'Aubrietia.' The Primula shown under this name on February 20, 1940, was selected for trial at Wisley subject to the name being changed. It has now been renamed *P. malacoides* 'Lilac Queen.'

FLORAL COMMITTEE B.—Lord ABERCONWAY, C.B.E., V.M.H., in the Chair, and eighteen other members present.

Awards Recommended :

Silver Flora Medal.

To Messrs. Hillier & Sons, Winchester, for flowering trees and shrubs.

Silver Banksian Medal.

To Messrs. J. Cheal & Sons, Ltd., Lowfield Nurseries, Crawley, for flowering trees and shrubs.

To Knap Hill Nursery, Ltd., Woking, for flowering trees and shrubs.

To Mr. E. Ladham, Elstead, Surrey, for rock garden shrubs.

To Messrs. L. R. Russell, Ltd., Windlesham, Surrey, for flowering trees and shrubs.

Flora Medal.

To Messrs. Barr & Sons, Taplow, Bucks, for Narcissi and other bulbous plants.

To The Stuart Low Co., for Camellias and other flowering shrubs.

To Messrs. D. Stuart & Son, Ltd., Ferndown, Dorset, for Narcissi and flowering shrubs.

To Messrs. J. Waterer, Sons & Crisp, Ltd., Twyford, Berks, for rock garden plants.

Banksian Medal.

To Messrs. W. A. Constable, Ltd., Southborough, Kent, for Lachenalias.

To Mr. K. W. Harle, Lower Basildon, Berks, for succulents.

To Orchard Neville Nurseries, Ltd., Baltonsborough, Somerset, for rock garden plants.

To Messrs. M. Prichard & Sons, Ltd., Christchurch, Hants, for rock garden plants.

To Messrs. G. Reuthe, Ltd., Keston, Kent, for shrubs.

To Mr. J. Southgate, West Ewell, Surrey, for succulents.

Other Exhibits.

Mr. A. Corderoy, Eltham : rock garden plants.

Dame Alice Godman, Horsham : *Lachenalia Nelsonii* seedling.

Mrs. K. Hopkinson, Coulsdon : rock garden plants.

L. de Rothschild, Esq., Exbury, Southampton : *Erica glauca* var. *elegans*.

ORCHID COMMITTEE.—Mr. CHAS. H. CURTIS in the Chair, and ten other members present.

Awards Recommended :

Silver Banksian Medal.

To Messrs. Charlesworth & Co., Haywards Heath, for a group of Orchids.

■ To Messrs. Sanders, St. Albans, for a group of Orchids.

■ To Messrs. J. & A. McBean, Cooksbridge, for Cymbidiums.

Award of Merit.

To *Laeliocattleya* × 'New York' var. 'Illumini' (*L.c.* 'Aconcagua' × *C. Maggie Raphael* 'alba') (votes 9 for, 0 against), from Baron Bruno Schröder, The Dell Park, Englefield Green, Surrey. See p. 151.

To *Cymbidium* × 'Ramboda' var. 'Invincible' ('Venus' × 'Pearl') (votes 9 for, 0 against), from Messrs. J. & A. McBean. See p. 151.

To *Odontioda* × 'Astoria' var. 'Gloria' (*Oda. Pittiae* × *Odm. crispum*) (votes 7 for, 0 against), from Messrs. Charlesworth & Co. See p. 151.

To *Vuyistekarea* × 'Redskin' var. 'Artona' (*Vuyistekarea* 'Leda' × *Odontonia* 'Latona') (votes 7 for, 0 against), from Messrs. Charlesworth & Co. See p. .

Other Exhibits.

Lionel de Rothschild, Esq., Exbury : *Cymbidium* 'Golden Horn' and *Odontoglossum* 'Bonzo'.

A. E. Nicholson, Esq., 20 Russell Road, Purley : *Odontioda* 'Zeta.'

NARCISSUS AND TULIP COMMITTEE.—Mr. E. A. BOWLES, F.L.S., F.R.E.S., V.M.H., in the Chair, and thirteen other members present.

Awards Recommended :—

Silver Banksian Medal.

To The Trenoweth Valley Flower Farm, Ltd., St. Keverne, Cornwall, for an exhibit of Daffodils.

Other Exhibit.

Narcissus 'Bonython,' shown by The Trenoweth Valley Flower Farm, Ltd.

JOINT RHODODENDRON COMMITTEE.—Mr. J. B. STEVENSON, V.M.H., in the Chair, and seven other members present.

Award Recommended :—

Award of Merit.

To Rhododendron \times 'Maya' (*R. sutchuenense* \times *R. Rirei*), as a hardy flowering plant for the woodland garden (votes 7 for, 0 against), from E. J. P. Magor, Esq., Lamellen, St. Tudy, Bodmin, Cornwall.

JOINT ROCK-GARDEN PLANT COMMITTEE.—Major F. C. STERN, F.L.S., in the Chair, and ten other members present.

No plants were submitted to the Committee on this occasion.

MARCH 19, 1940.

A lecture was given by Capt. F. KINGDON WARD on "My Recent Plant Hunting in Assam and Eastern Himalayas." Chairman, The Lord ABERCONWAY, C.B.E., V.M.H.

SCIENTIFIC COMMITTEE—Mr. E. A. BOWLES, M.A., F.L.S., V.M.H., in the Chair, and six other members present.

Fruits of Tacca cristata.—Mr. Robinson showed from the Chelsea Physic Garden the large oval fleshy fruits of *Tacca cristata*.

Helleborus vesicarius.—Dr. Balfour Gourlay showed a plant in full flower of *Helleborus vesicarius*, from Syria. This species has rather small foliage, is herbaceous, quite hardy (having been exposed to the full effects of the past winter), has flowers much resembling *H. foetidus*, but seeds without an aril and large vesicular fruits. Though described long since it has only recently come into cultivation.

Thickened lateral growth.—Mr. Bullock sent from Leicestershire a branch of an unnamed shrub, probably a *Prunus*, with a lateral growth somewhat swollen towards the base and gradually tapering towards the end of the growth (broken off about 18 inches from its origin), but even there many times as thick as the normal shoots. The cause was probably damage to the bark at the base of the peculiar shoot preventing the downward flow of sap but not interfering with the water supply.

Crested Cyclamen.—Mr. Cairns of Mossley Hill, Liverpool, sent flowers of a Persian Cyclamen which he had raised, with a crest up the middle of the front of the petals. This crested type has been known for some time and comes true from seed.

Gall on Salix.—Mr. Bowles showed shoots of *Salix* in which a bud of 1938 formation had been galled and was much increased in size, and more or less open. It was produced by the saw-fly *Cryptocampus medullaris*.

FRUIT AND VEGETABLE COMMITTEE.—Mr. F. A. SECRETTE, V.M.H., in the Chair, and ten other members present.

Awards Recommended :—

Silver Hogg Medal.

To Messrs. J. Cheal & Son, Ltd., for collection of Apples.

To the Trade Commissioner for the Union of South Africa for display of Apples, Pears, Plums, Peaches and Grapes.

Other Exhibits.

Mr. Howard H. Crane, Highmead, Cheney Lane, Eastcote, Pinner: Apple 'King of Tomkins County.'

Lady Leconfield, Petworth Park, Petworth: Chicory 'Red Venetian,' Labrador Kale; Lettuces 'Arctic,' 'Commodore Nutt,' 'Golden Ball' and 'Stanstead Park.'

FLORAL COMMITTEE A.—Mr. G. W. LEAK, V.M.H., in the Chair, and nineteen other members present.

Awards Recommended :—

Silver Banksian Medal.

To Messrs. Allwood, Bros., for Carnations.

To Messrs. C. Engelmann, Ltd., for Carnations, Pansies, etc.

Banksian Medal.

To The Stuart Low Co., for Carnations.

To Messrs. Wakeley Bros., & Co., Ltd., for Crocuses, Daffodils, etc.

Selected for trial at Wisley.

Primula 'White Wanda' from H. Nelson Wright, Esq., The Larches, Warlingham.

FLORAL COMMITTEE B.—Mr. W. R. OLDHAM, V.M.H., in the Chair, and twenty-two other members present.

Awards Recommended :—

Silver-gilt Banksian Medal.

To Messrs. Hillier & Sons, for flowering trees and shrubs.

To Knap Hill Nursery, Ltd., for flowering trees and shrubs.

Silver Flora Medal.

To Messrs. J. Cheal & Sons, Ltd., for flowering trees and shrubs.

To Messrs. L. R. Russell, Ltd., for flowering trees and shrubs.

Flora Medal.

To Messrs. G. Jackman & Son, Woking, for Clematis and other flowering shrubs.

To Mr. E. Ladham, for a rock garden.

To The Stuart Low Co., for Camellias and other flowering shrubs.

To Messrs. M. Prichard & Son, Ltd., for rock garden plants.

Banksian Medal.

To Mr. E. Ballard, Colwall, Malvern, for rock garden plants.

To Mr. A. Corderoy, for rock garden plants.

To Mr. K. W. Harle, for succulents.

To Orchard Neville Nurseries, Ltd., for rock garden plants.

To Messrs. D. Stewart & Son, Ltd., for rock garden plants.

To Mr. W. Wells, jnr., Merstham, Surrey, for rock garden plants.

Cultural Commendation.

To Mrs. R. D. Trotter, Leith Vale, Ockley, Surrey, for a pan of *Narcissus asturiensis*.

Other Exhibits.

W. Balfour Gourlay, Esq., Cambridge : *Helleborus vesicarius* E.K.B. 2125.

Mr. Stuart Boothman, Maidenhead : rock garden plants.

Messrs. Burkwood & Skipwith, Ltd., Kingston-on-Thames : flowering shrubs.

E. D. Doncaster, Esq., Burley, Hants : *Edgeworthia papyrifera*.

Mrs. K. Hopkinson, : rock garden plants.

Messrs. W. E. Th. Ingwerson, Ltd., East Grinstead : rock garden plants.

Marsden Nurseries, Ashtead, Surrey : rock garden plants.

Lt.-Col. L. C. R. Messel, Handcross, Sussex : *Ophrys ? atrata*.

Messrs. G. Reuthe, Ltd., Rhododendrons and other shrubs.

Mr. J. Southgate : succulents.

Messrs. Toogood & Sons, Ltd., Southampton : rock garden plants.

ORCHID COMMITTEE.—Sir JEREMIAH COLMAN, Bart., in the Chair, and ten other members present.

Awards Recommended :—

Gold Medal.

To G. P. Harben, Esq., Colbury House, Testwood, Hants, for a group of *Cymbidiums*.

Silver Banksian Medal.

To Messrs. Sanders, for a group of Orchids.

To Messrs. J. & A. McBean, for *Cymbidiums*.

To Messrs. Charlesworth & Co., for a group of Orchids.



FIG. 38.—*ARCTOMECON CALIFORNICUM*.

By kind permission of the Keeper of Botany, British Museum (Natural History).
(See p. 138.)

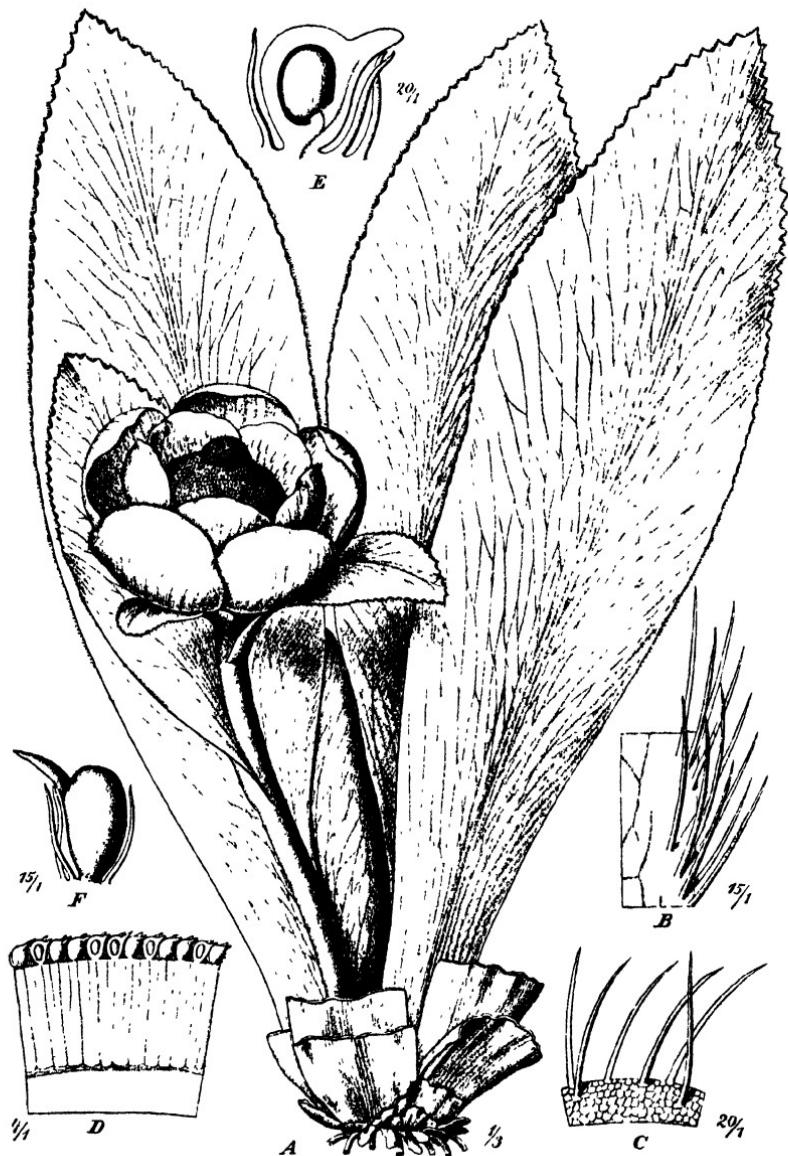


FIG. 39.—*LACCOPTETALUM GIGANTEUM.*

Reproduced from Engler's *Botanische Jahrbücher*, 1906, **37**, 405.
 (See p. 138.)

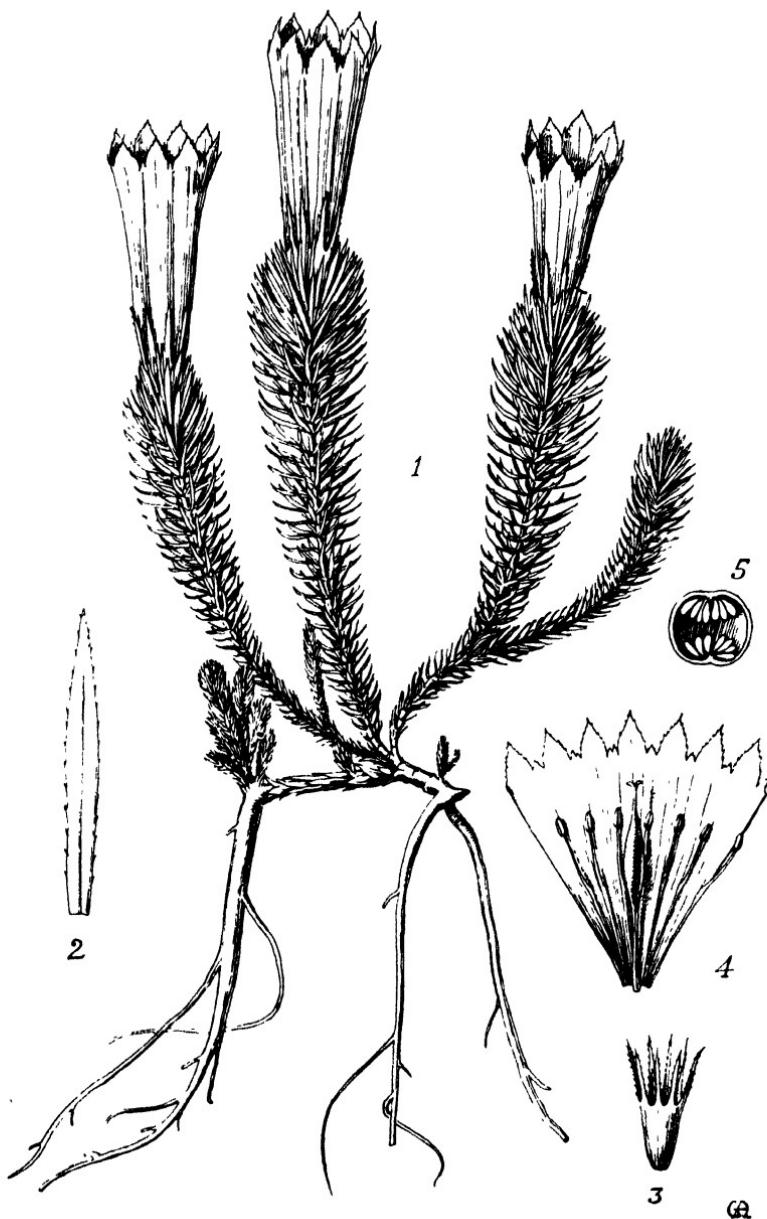


FIG. 40 - *GENLIANA SETULIFOLIA*.

Reproduced from Fig. 3162 of Hooker's *Icones Plantarum* by kind permission of the *Bentham-Moxon Trustees*.

(See p. 141.)



COLLECTED BY
DUTCH SW. NEW GUINEA
I. S. GIBBS
1911

Rhododendron devriesianum
var. magnificum
S. C. & A. N. S. 1911

Rhododendron devriesianum
var. magnificum
S. C. & A. N. S. 1911

FIG. 41.—*RHODODENDRON DEVRIESIANUM.*

By kind permission of the Keeper of Botany, British Museum (Natural History).
(See p. 139.)



Photo N K Gould]

FIG 42.- PRIMULA DENTICULATA AT WISLEY.
(See p. 131.)

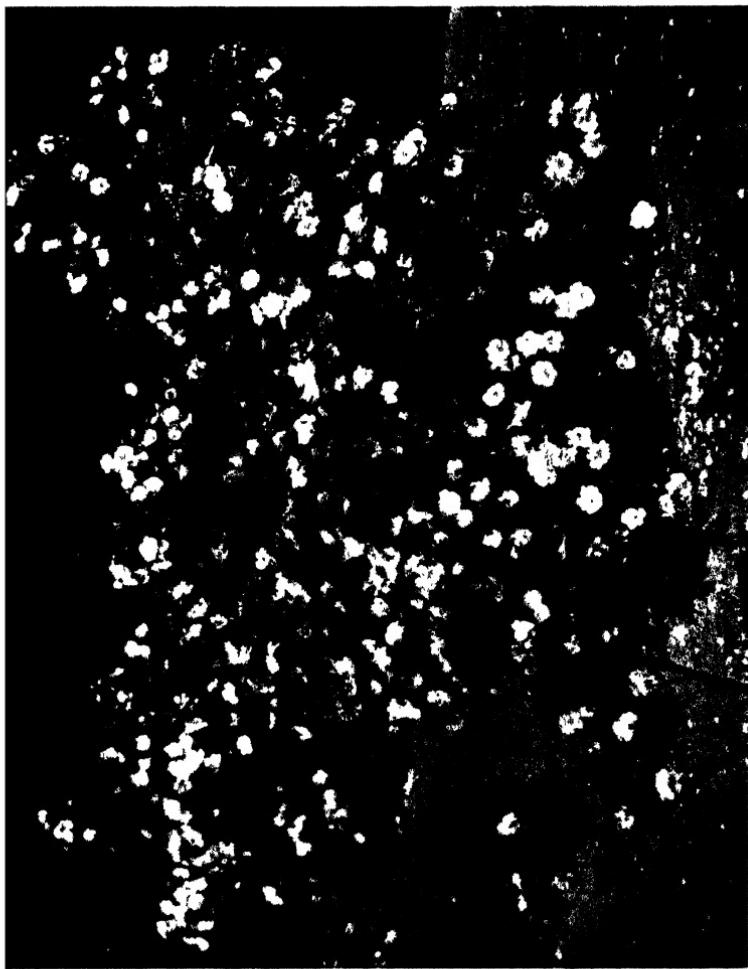


Photo N. K. Gould

FIG. 43 - *Rosa spinosissima* VARIETIES AT WISLEY.
(See p. 132.)



Photo: N. K. Gould]

FIG. 44 - *ERICA ARBOREA* ALMENA AT WISLEY.
(See p. 131)



Photo. N. K. Gould]

FIG. 45.—*PRUNUS SUBHIRTILLA PENDULA* AT WISLEY.
(See p. 132.)

[To face p. xlvi.

Award of Merit.

To *Vuylstekeara* × 'Armanda' (*V. 'Melba'* × *Odm. 'Neron'*) (votes 7 for, 2 against), from Messrs. Charlesworth & Co

To *Cymbidium* × 'Ramboda' var. 'Colossal' ('Venus' × 'Pearl') (votes 8 for, 1 against), from Messrs. J. & A. McBean.

Cultural Commendation.

To Mr. A. C. Rathbone, gr. to G. P. Harben, Esq., for *Cymbidium* × 'Ramboda,' with three spikes bearing respectively 18, 14 and 13 flowers.

Other Exhibits.

Sir William Cooke, Bart., Hampstead Norris, Berks., *Cymbidium* × 'Redpole' and *Odontioda* × 'Zeta.'

Cymbidium × 'Swift.'—The plant which received an Award of Merit under this name on April 18, 1939, when exhibited by Sir William Cooke, Bart., has been renamed *Cymbidium* × 'Wyld Court Swift,' as the name 'Swift' had previously been used for a *Cymbidium* hybrid of different parentage.

NARCISSUS AND TULIP COMMITTEE.—Mr. E. A. BOWLES, F.L.S., F.R.E.S., V.M.H., in the Chair, and nine other members present.

Awards Recommended :—*Silver-gilt Banksian Medal.*

To The Trenoweth Valley Flower Farm, Ltd., Cornwall, for an exhibit of Daffodils.

Silver Flora Medal.

To Messrs. Barr & Sons, 13 Covent Garden, London, W.C. 2, for an exhibit of Daffodils.

To Mr. Guy L. Wilson, Broughshane, Co. Antrim, for an exhibit of Daffodils.

Silver Banksian Medal.

To Messrs. R. H. Bath, Ltd., for an exhibit of Tulips and Daffodils.

Silver Lindley Medal.

To Mr. A. Gray, Penpol, Devoran, Truro, for an exhibit of Miniature Daffodils.

Award of Merit.

To *Narcissus Marvieri* as a plant for the alpine house (votes 10 for, 0 against). Shown by Dr. P. L. Giuseppi, Trevoose, Felixstowe.

JOINT RHODODENDRON COMMITTEE.—Mr. J. B. STEVENSON, V.M.H., in the Chair, and eight other members present.

Exhibits.

Mr. Lionel de Rothschild, Exbury, Southampton: *Rhododendron stenaulum* (F. 26418).

Mr. E. J. P. Magor, Lamellen, St. Tudy, Bodmin, Cornwall: *R. barbstutch* (*R. barbatum* × *R. sutchuenense*): *R. 'Fargcalo'* (*R. Fargesii* × *R. calophyllum*).

Mr. E. D. Doncaster, Byways, Burley, Hants: *R. moupinense* (natural hybrid).

Mrs. C. S. Louch, Oak Cottage, Forest Ridge, Keston, Kent: unnamed Azalea variety.

JOINT ROCK-GARDEN PLANT COMMITTEE.—Major F. C. STERN in the Chair, and eleven other members present.

Award Recommended :—*Cultural Commendation.*

To Mr. J. Shanahan, gardener to Mr. G. P. Baker, V.M.H., Hillside, Kippington, Sevenoaks, for *Saxifraga Burseriana* 'Gloria' (F.C.C., 1917).

Other Exhibits.

Mrs. C. B. Saunders, Husseys, Green Street Green, Farnborough, Kent: *Primula* hybrid (*P. Winteri* × *P. scapigera*).

Mrs. G. Anley, St. George's, Wych Hill Lane, Woking: *Nandina domestica laciniata purpurea*; *Nandina domestica laciniata*; *Chamaecyparis obtusa minima*.

Messrs. M. Prichard & Sons, Ltd., Riverslea Nurseries, Christchurch: *Saxifraga 'Cranbourne'* (*Saxifraga oppositifolia* × *S. lacicina*), A.M., 1936; *Saxifraga 'Mother Queen'* (*S. Burseriana* × *S. lacicina*).

Dr. Giuseppi, Trevoose, Felixstowe: *Rhodothamnus Chamaecistus* (A.M., 1925); *Erica Pageana* (A.M., 1937).

Mr. P. A. Ferns, Seven Gables, Wilmslow, Cheshire: *Sempervivum ciliosum* forma Ali Botusch (to be seen again).

APRIL 2, 1940.

SEWELL MEDAL COMPETITIONS.

The Amateur's Medal for the best three pots or pans of alpines was awarded to G. H. Berry, Esq., Enfield, and the Horticultural Trader's Medal for the best six pots or pans to Messrs. Clarence Elliott, Ltd., Stevenage.

The first "Masters Memorial Lecture" of the year was given by Professor F. E. WEISS, his subject being "Graft Hybrids and Chimaeras." Chairman, Sir DANIEL HALL, K.C.B., LL.D., D.Sc., F.R.S., V.M.H.

SCIENTIFIC COMMITTEE.—Mr. E. A. BOWLES, M.A., F.L.S., F.R.E.S., V.M.H., in the Chair, and four other members present.

Tulip breaking.—Sir Daniel Hall sent the deep crimson white-based Tulip 'Clos de Vougeot' to illustrate the type of breaking which occurs in glossy deep crimson flowers where the effect is seen in patches of deeper colour, not in white streaking. This type is called "Clotted Break."

Tulips.—He also sent plants of a Tulip collected in the island of Chios, having rather tall stems with brick-red, rather small and narrow flowers with a yellow base, which he regarded as the wild form of *Tulipa praecox*, but which some members of the Committee thought much resembled *T. boetica*. A plant of *T. Greigii* was also sent with only a trace of the basal black blotches usually seen in the flower of this species but with the normal variegation of the leaves.

Twin-flowered Narcissus.—Mr. Bowles showed a specimen of *Narcissus pumilus* with two normal flowers on the scape, grown in Mr. R. D. Trotter's garden and

Twin-flowered Snowdrop, from Mr. John Gray's garden at Saxmundham; it appeared to be constant in this character, which is referred to in the JOURNAL R.H.S., vol. 13, p. 202 (with a figure), by F. W. Burbidge, and named by Mr. Wilks *Galanthus Elwesii globosus*.

Gnaws on shoots of Forsythia intermedia.—Mr. Bowles also showed a number of shoots of Forsythia with roundish outgrowths having the appearance of much-branched arrested adventitious roots. These were referred to Mr. D. E. Green for investigation.

FRUIT AND VEGETABLE COMMITTEE.—Mr. F. A. SECRETT, V.M.H., in the Chair, and ten other members present.

Exhibits.

Fruit display by the Trade Commissioner for the Union of South Africa.

FLORAL COMMITTEE A.—Mr. G. W. LEAK, V.M.H., in the Chair, and sixteen other members present.

Awards Recommended :—*Gold Medal.*

To Lionel de Rothschild, Esq., O.B.E., V.M.H. (gr. Mr. F. Hanger), for Clivias.

Silver-gilt Banksian Medal.

To Messrs. Allwood Bros., for Carnations.

Silver Banksian Medal.

To Ashington Nurseries, Ltd., Ashington, for Carnations.

To Messrs. C. Engelmann, Ltd., for Carnations.

Flora Medal.

To Messrs. Blackmore & Langdon, Bath, for Polyanthus and Schizanthus.

Banksian Medal.

To Messrs. Allwood Bros., for *Dianthus Allwoodii* and hardy Carnations.

To Messrs. C. Engelmann, Ltd., for Pansies.

To The Stuart Low Co., for Carnations.

To Messrs. Wakeley Bros. & Co., Ltd., for Crocuses, Daffodils, Tulips.

Award of Merit.

To *Clivia 'Hamilcar'* as a greenhouse flowering plant (votes unanimous), from Lionel de Rothschild, Esq., O.B.E., V.M.H. (gr. Mr. F. Hanger).

To *Clivia 'Hannibal'* as a greenhouse flowering plant (votes unanimous), from Lionel de Rothschild, Esq., O.B.E., V.M.H.

FLORAL COMMITTEE B.—Lord ABERCONWAY, C.B.E., V.M.H., in the Chair, and twenty other members present.

Awards Recommended :—*Silver-gilt Banksian Medal.*

To Messrs. Hillier & Sons, for flowering trees and shrubs.

To Knap Hill Nursery, Ltd., for flowering trees and shrubs.

To Messrs. L. R. Russell, Ltd., for flowering trees and shrubs.

Silver Lindley Medal.

To F. Barker, Esq., Onosma, Stevenage, for a collection of varieties of *Primula Allionii*.

Silver Flora Medal.

To Messrs. J. Cheal & Sons, Ltd., for flowering trees and shrubs.

To Mr. E. Ladham, for a rock garden.

To Mr. W. J. Marchant, for *Shortia uniflora grandiflora*.

Silver Banksian Medal.

To Messrs. Clarence Elliott, Ltd., Stevenage, for Saxifrages and Primulas.

Flora Medal.

To Messrs. G. Jackman & Son, for Clematis and other shrubs.

To The Stuart Low Co., for Camellias and other shrubs.

Banksian Medal.

To T. T. Barnard, Esq., Wareham, Dorset, for species of *Morea* and *Gladiolus*.

To Mr. A. Corderoy, for rock garden plants.

To Mr. K. W. Harle, for succulents.

To Orchard Neville Nurseries, Ltd., for rock garden plants.

To Messrs. M. Prichard & Son, Ltd., for rock garden plants.

To Mr. J. Southgate, for succulents.

Award of Merit.

To *Prostanthera Sieberi* as a flowering shrub for the cool greenhouse (votes 16 for, 0 against), from the Director, Royal Botanic Gardens, Kew.

To *Shortia uniflora grandiflora* 'Snowflake' as a hardy flowering plant for the woodland garden (votes 11 for, 0 against), from Mr. W. J. Marchant.

Other Exhibits.

Messrs. Burkwood & Skipwith, Ltd., Kingston-on-Thames: flowering shrubs.

Messrs. J. Cheal & Sons, Ltd.: rock garden plants.

Mrs. K. Hopkinson, Surrey: rock garden plants.

Marsden Nursery, Ashtead: rock garden plants.

Messrs. M. Prichard & Son, Ltd.: *Primula denticulata* 'Rose Queen.'

ORCHID COMMITTEE.—Sir JEREMIAH COLMAN, Bart., in the Chair, and eleven other members present.

Awards Recommended :—*First-class Certificate.*

To *Cymbidium* × 'Janette' var. 'A. McBean' ('Joy Sander' × *Alexandri*) (votes unanimous), from Messrs. J. & A. McBean.

Award of Merit.

To *Cymbidium* × 'Balkis,' Exbury var. (*Alexandri* × 'Rosanna') (votes unanimous), from Lionel de Rothschild, Esq.

To *Cymbidium* × 'Altair,' Exbury var. (*Pauwelsii* × 'Pipit') (votes 8 for, 0 against), from Lionel de Rothschild, Esq.

To *Cymbidium* × 'Queen Mary' ('Jason' × 'Flamingo'), (votes 10 for, 0 against), from Messrs. H. G. Alexander, Tetbury, Glos.

Silver Banksian Medal.

To Messrs. Charlesworth & Co., for a group of Orchids.

To The Stuart Low Co., Jarvis Brook, for a group of Orchids.

To Messrs. J. & A. McBean, for a group of Orchids.

To Messrs. H. G. Alexander, for a group of Orchids.

NARCISSUS AND TULIP COMMITTEE.—Mr. E. A. BOWLES, F.L.S., F.R.E.S., V.M.H., in the Chair, and fourteen other members present.

Awards Recommended :—*Silver-gilt Flora Medal.*

To Mr. J. L. Richardson, Prospect House, Waterford, for an exhibit of Daffodils.

Silver-gilt Banksian Medal.

To Messrs. Barr & Sons, for an exhibit of Daffodils and Tulips.

Silver Flora Medal.

To the Trenoweth Valley Flower Farm, Ltd., for an exhibit of Daffodils.

Silver Banksian Medal.

To Mr. R. F. Calvert, Coverack, Cornwall, for an exhibit of Daffodils.

Flora Medal.

To Messrs. D. Stewart & Son, for an exhibit of Daffodils.

*Award of Merit.**Preliminary Commendation.*

To *Narcissus 'Tramore'* (votes 11 for, 0 against), from Mr. J. L. Richardson.
 To *Narcissus 'Aranjuez'* (votes unanimous), from Mr. J. L. Richardson.
 See p. 151.

Other Exhibits.

Mr. J. L. Richardson : *Narcissus 'Argyll'* and *N. 'Trewirgie.'*
 The Trenoweth Valley Flower Farm, Ltd. : *Narcissus '224W.'*
 Sir Daniel Hall, V.M.H., Long Sutton House, Basingstoke : Cottage Tulip '*Clos de Vougeot*', broken ; *Tulipa Greigii* and *T. praecox*. Sir Daniel, who was present, explained that the specimens of the Cottage Tulip '*Clos de Vougeot*' were broken and illustrated the fact that glossy, dark-crimson or scarlet Tulips, even if they have white bases, do not show any white in the body of the segments when infected with virus, but have instead patches of deeper colour, i.e., they give a "clotted break." A specimen of *Tulipa Greigii* was an example of an exceptionally fine flower obtained from seed without hybridization. The segments were bright scarlet, the usual black basal markings being represented only by dark stains on the yellow, which was unusually prominent. The third Tulip was *praecox*, grown from bulbs obtained from the island of Chios where the species is grown commercially and sent to Athens for garden use.

The Peter Barr Memorial Cup.

It was unanimously recommended that the Peter Barr Memorial Cup, which is awarded annually to someone who has done good work of some kind in connexion with Daffodils, be awarded to Mr. W. Slinger for his work as a raiser and exhibitor of Daffodils.

JOINT RHODODENDRON COMMITTEE.—Mr. J. B. STEVENSON, V.M.H., in the Chair, and twelve other members present.

Awards Recommended :*First-class Certificate.*

To *Rhododendron × 'Ethel'* (*R. F. C. Puddle* × *R. repens*) (votes unanimous), from Lord Aberconway, Bodnant, N. Wales.

Awards of Merit.

To *R. × 'Sulfmeg'* (*R. sulfureum* × *R. megeratum*) (votes 9 for, 0 against), from E. J. P. Magor, Esq.

To *R. × 'Grand Prix'* (*R. grande* × *R. eximium*) (votes 9 for, 0 against), from Admiral A. Walker-Heneage-Vivian, Clyne Castle, Blackpill, Swansea, Glam.

To *R. × Elsa var. Clyne* (*R. grande* × *R. Hodgsonii*) (votes 8 for, 0 against), from Admiral A. Walker-Heneage-Vivian.

Cultural Commendation.

To Mr. P. Collyer, gardener to Mrs. Gwendolyn Anley, for a plant of *Rhododendron chrysanthum*.

Other Exhibits.

The Marquess of Headfort, F.L.S., V.M.H., Headfort, Kells, Co. Meath : *R. semnooides*, F25630 ; *R. 'Restart'* (*R. aperantum* × *R. euchaites*) ; *R. velereum*, F25646, F25647 (?) ; *R. species No. 1*—with F21736 ; *R. species No. 2*—with F20333.

E. J. P. Magor, Esq. : *R. 'Androcles'* (*R. arboreum album* × *R. calophytum*).

Mrs. Gwendolyn Anley : *R. pumilum*.

Admiral A. Walker-Heneage-Vivian : *R. Falconeri* × *R. eximium* (2 specimens) ; *R. grande* × *R. Falconeri* (2 specimens).

JOINT ROCK-GARDEN PLANT COMMITTEE.—Major F. C. STERN in the Chair, and six other members present.

Award Recommended :*Award of Merit.*

To *Aquilegia Jonesii* (votes 6 for, 0 against), from Messrs. W. E. Th. Ingwersen, Ltd., Birch Farm, Gravetye, East Grinstead, Sussex.

Other Exhibits.

Mrs. Gwendolyn Anley : *Primula pubescens 'Rae Berry'* ; *Primula viscosa alba*.

Dr. Giuseppe : *Calopogon pulchellus*.

Messrs. M. Prichard & Sons, Ltd. : *Primula marginata* var. *rosea* (*P. viscosa* × *P. marginata*).

OTHER COMMITTEES.

The Joint Iris Committee and the Joint Perpetual Flowering Carnation Committee had no exhibits before them on this occasion.

cannot be grown in a hurry, so the sooner one is planted the better. It should be handy for the kitchen, but it is always ornamental and holds a worthy place among the choicest shrubs.

Of *Parsley* the seedsmen catalogue many varieties, but the criterion seems to be the degree of fineness and curliness of leaf, for in England a great deal more Parsley is used for garnishing than in cooking, much to the annoyance of people who dislike raw Parsley, but are always having to disentangle fragments of it that have strayed on to their plate. Two or three times as much space must, however, be given to Parsley as to any other herb, say three rows a foot apart, which are sown in succession in March, June, and August. The June sowing should be covered with a continuous cloche so as to provide fresh Parsley during the dead of winter and early spring before the August sowing is ready. The gardener with glass at his disposal will start a box or two at the turn of the year. Parsley is one of the constituents of the "bouquet" which all French cooks instruct one to add in the early stages of so many dishes which begin by boiling or cooking either meat or fish in a casserole. The normal "bouquet" consists of a Bay leaf, a sprig or two of Thyme and of Parsley; sometimes Tarragon is also added. Again, a little chopped Parsley is found in a multitude of recipes; and everyone knows "Parsley sauce" and "Parsley butter." Fried Parsley again is a delightful accompaniment to fried Sole and, indeed, almost any fried fish.

Chervil will also want renewing from seed every year; one row will be sufficient; except for Thyme and Chives the rows in the herb garden may be a foot apart. Chervil is an element in the "fines herbes"—finely chopped Parsley, Chives, Tarragon and Chervil—which should be part of any mixed salad. For a Tomato salad chopped Chervil should be sprinkled over the slices before the French dressing is poured on. The "fines herbes" of an omelette should be chopped Chervil and Parsley. To many vegetable soups a little chopped Chervil is added at the last minute.

Next to the Chervil may come a row of Sorrel; perhaps, unless you have acquired a taste for Sorrel one row may be divided between it and Chervil. Sorrel is perennial, but should be renewed every third year or so. Chopped Sorrel is a pleasant addition at the last minute to a Potato or Onion soup, or may be made the basis of a definitely Sorrel soup.

For this pleasant summer soup you require $\frac{1}{2}$ lb. each of Sorrel and of Potatos. Melt 2 oz. of butter in a saucepan and throw in the Sorrel leaves. Stir rapidly and then add a quart of water or half water and half veal stock. Add the Potatos cut into small pieces. Salt well and leave to boil with the lid well fixed for about an hour. Pass the whole through a sieve. Add a gill of thick cream. Reheat the whole, but do not allow to boil.

A few leaves of Sorrel may be added to any green salad; not too many, for they are sharply acid.

Thyme is one of the herbs most in demand and, being a dwarf

grower, may be given two rows six inches apart. Though perennial, it should be renewed every second or third year by slips torn off the old stocks and planted in March or early April. Thyme is wanted for the bouquet, for things like veal stuffing and forcemeat balls, but in English cookery it is perhaps too freely used because the flavour is very pervasive. In many cases it should be replaced by Tarragon.

Of *Marjoram* (*Pot Marjoram—Origanum Onites*) a small quantity will suffice, half a row at most; the flavour is strong and as a rule it is only used with Thyme in stuffings, or in the liquor of a marinade. There are recipes in which it is used with boiled beef.

Tarragon is often added to "the bouquet" and it can, indeed should often, be used instead of, or in addition to, Parsley, with most fish dishes for example. Tarragon butter is excellent with grilled sole, and chopped Tarragon with grilled herrings. Tarragon also finds its place in many vegetable soups, for example finely chopped in Potato or Onion soup. For Tarragon vinegar, see below. Tarragon is one of the most valuable of all herbs, far too much neglected in England. It is perennial, grows freely from cuttings or slips, but like other herbs should be replanted every second or third year. It grows fairly strongly and should be accorded its row and the half row to spare from the Marjoram.

Sage is also perennial and should be renewed by slips, taken in June and rooted in sand under a cloche, every second or third year. It is a coarsely flavoured herb, whose uses are only too well known in England—Sage and Onion stuffing, Sage cheese and Sage tea.

Mint is a peculiarly English herb, though America invented and retains a monopoly of Mint Julep. Mint sauce is our own speciality, as also is the boiling of Mint leaves with new Potatos and green Peas. Mint plantations should be renewed every year by tearing off slips with roots in April and planting them. I prefer the Round-Leaved Mint (*Mentha rotundifolia*) to the common kind for its richer and fuller flavour, but some people find it coarse.

Shallots and *Chives* are members of the Onion family, smaller and more refined in flavour, botanically distinguished by not forming seeds, so that they are reproduced by dividing the little bunch of bulbs that the planted bulb gives rise to. Planting should be done early in the year, in February if the weather permits.

Shallots should always be preferred to Onions for sauce making and for cooking with delicately flavoured meats like veal or chicken.

Chives are appropriately included in salads, and in the sauces like "Tartar," "Béarnaise," "Ravigote," where "fines herbes" with chopped Capers, Gherkins and Chives are compounded with various forms of mayonnaise or plain oil and vinegar.

Mention has already been made of the Laurel or Bay tree, but its value cannot be exaggerated. A Bay leaf in a rice pudding or a custard supplies just the delicate flavouring that is appropriate; no cook can be trusted with essence of bitter almonds—natural or synthetic. Then a Bay leaf goes so well with fish; try a herring, cleaned, peppered

and salted, wrapped with a Bay leaf in greased paper and baked. Even trout may be made into a good dish when treated in this way, but a slice of fat bacon also must be folded inside the fish.

Of *Fennel* only a single plant is wanted in the garden, though it will sow a continuous series of seedlings in the ground round about. Fennel with its strong aniseed-like flavour figures in few recipes except in a fish sauce, but in that it is supreme when once the unexpected flavour has been accepted. Blanch pieces of Fennel for a few minutes in hot salted water, drain, chop very finely, Mix this into either a white or a mousseline sauce. This is *the* sauce for mackerel, but also is very pleasant with salmon or trout.

It appears to be difficult to induce 'Finocchio,' the bulbous-rooted variety of Fennel, to form bulbs in our climate.

Nor indeed need much be said of *Borage*; it is a perennial with a not unattractive flower, but a single plant in some odd corner will furnish the few sprigs that will be wanted for its only purpose—the final flavour for a cider cup.

Herbs, of course, are only available during the late spring and summer, but they are wanted in the kitchen all the year round. Fortunately most of them can be dried, and retain their characteristic flavours in that state. Bunches of Thyme, Marjoram, Tarragon, Sage and Mint should be gathered in their prime, say in August, and hung in an airy place indoors, best of all from the rafters of an unheated greenhouse. When apparently quite dry they should be spread on a newspaper before a good fire and while hot rubbed into a powder. Then reject the stalks and put the powder into a wide-mouthed bottle, also dried and warmed before the fire, and provided with a sound cork. Bay leaves may be gently dried in the sun and finished before the fire, then also corked up. This will furnish first-rate material for sauces and flavourings in the winter.

One other provision for winter is to prepare salad vinegar, which will bring the flavour of the summer herb into the dressing of a winter salad. In the summer gather a quarter of a pound of fresh Tarragon leaves and put it into a deep jar with two ounces of Chervil; add a dash of Chives and one clove of Garlic and pour on four bottles of white wine vinegar. Stir, cover and leave to soak for a fortnight, then strain off and bottle; keep in a dark cupboard.

With this and her dried herbs the housewife will be fully enabled to maintain through the dull days the fragrance of her cuisine.

FOOD FROM THE GARDEN.

By Dr. H. V. TAYLOR, O.B.E., V.M.H.

[*Résumé* of a Lecture given on March 5, 1940; The Lord ABERCONWAY,
C.B.E., V.M.H., in the Chair.]

THE love of flowers and beautiful lawns is so deeply ingrained in the hearts of most English people that food production in the garden takes a very secondary place during periods of peace in this country. This is no reflection on our national character, for gardening for beauty is a delightful hobby and the gardener in pursuit of beauty gains real joy and happiness. That is why the Royal Horticultural Society has over 30,000 members. The days of war, however, are upon us, and Food Production must receive first consideration in our gardening efforts, for it would be very selfish to leave to others the task of providing all our food. So far as possible self-supply in all things should be our aim and object.

Food in War-Time.—The country began the war with food provided by its own soil which would have sufficed for a little over 120 days out of the 365 in each year, and the people have to rely on the Merchant Service to bring food during the other 240 days.

Wheat is brought from Canada, America and Australia; bacon from Denmark, Holland and North America; butter from Denmark and New Zealand; and fruit and eggs from the four corners of the world, and even simple vegetables like Onions from places as far away as Egypt. It is easy to realise the difficult task of maintaining these supplies in war-time, when submarines may lie on the trade routes and aeroplanes may fly overhead. The convoys of food ships have to be guarded and protected by destroyers, war ships and aeroplanes, and in consequence the fighting strength of the Navy is weakened. Most would agree, therefore, that it is our duty to grow as much food as possible to lessen the task of ships and to release the Navy to perform its fighting function. There is also another reason—finance. To a considerable extent foreign investments were sold to pay for the previous war and less is available for realisation this time to purchase food and munitions in foreign countries. The less food received, the more money will be available for buying munitions, and of these there cannot be too much.

People often think because the garden is small in size that the food that can be produced will be insignificant in volume and of no national importance. On the contrary, it has been shown that sufficient vegetables have been produced in a small garden of 300 square yards to keep a man, his wife and three children with vegetables for over 200 days. There are at least four million such gardens in the country, and the effort that could be made by this army of small producers in feeding themselves with vegetables would be really substantial.

Anyone who can and neglects to do this service is missing his opportunity of doing a real National Service. On these vegetables produced in gardens, there are savings in wood packages, petrol, transport and labour for distribution, and the man who produces his own has no worry concerning high prices in the shops nor the discomfort caused by short supply. Self-supply gives security and contentment.

Realising how the small cultivators could produce a great deal of food for themselves in gardens, the Ministry of Agriculture formed a scheme to foster, to encourage, to stimulate, to advise and to assist gardeners in their endeavours. Firstly, the Ministry published a Bulletin—Food from the Garden—of which over 300,000 copies have been sold (price 3d.), and this describes soil management to maintain its fertility and describes a method of crop planning to get a steady stream of vegetables in each month of the year.

Secondly, the Ministry has asked all Councils in towns with a population of 20,000 and over to establish a special war-time Horticultural Committee, comprising Councillors and representatives of the Horticultural and Allotment Societies, with the duty of developing vegetable culture to the fullest extent. The Minister suggested that the Park Superintendent should give his time during the war period to the important subject of food production by the town gardeners. I am happy to say the response has been very encouraging, for over 200 Committees have been set up and much enthusiasm for gardening has been created.

Panel of Gardeners.—Bulletins and Committees, while necessary forms of organisation, probably achieve less than the personal contact between man and man, especially when one of these is able to impart knowledge and the other anxious to receive it. The town gardeners needed advice, guidance and demonstration by personal contact, and the Minister was indeed only too anxious to accept the offer of the Royal Horticultural Society to form a panel of practical gardeners to make this personal contact.

Colonel DURHAM and Mr. J. WILSON have done wonderful work in forming a panel of over 300 gardeners, comprising some of the most noted gardeners of the country, who cannot fail to express their influence for good in thousands of gardens this year. Already some 200 lectures and talks have been arranged. It must be very gratifying to one possessed of an allotment or backyard garden to be able to seek advice from one of the most talented head gardeners in the land. It is wonderful, too, to realise that such men are ready to give time and knowledge without hope of any personal gain. Continued contact with Mother Earth creates the finest character.

Allotments.—There are other schemes concerning the requisitioning of land for gardening purposes, the supply of fertilisers, seeds, tools, insecticides, etc. and such like, all aiming to assist the man who wishes to cultivate soil for self-supply. Members of the seed trade have co-operated well in helping with supplies.

The Minister has asked all Councils of Urban Authorities to provide

land for allotment purposes and has given the authorities very wide powers for requisitioning unoccupied land for this purpose. The Minister has also extended to allotment holders the facilities which enable a subsidy of £2 per acre to be claimed for breaking up grassland for crop production, and also for securing lime and basic slag at the subsidised prices hitherto available to commercial growers.

The Bulletin—Food from the Garden—gives information on crops to grow. Some people have written to the Gardener's Chronicle and the Times giving ideas. Writers in the Times have advocated more Potatos, Parsnips and Artichokes, and the virtues of each have been extolled; yet many people dislike Parsnips and others cannot digest the Artichoke. The first rule to make in growing for self-supply is to grow only the vegetables that are appreciated in the household, for it is wasteful to grow vegetables that are not eaten. If Parsnips and Artichokes are appreciated these should be grown—if not, then the ground should be given over to the production of other crops. The plan of cropping in the official publication is only an example, and any plan must be of a changeable character to meet individual tastes.

The plan in the Bulletin provides for a small plot of Potatos only, yet the Potato is a wonderful vegetable and the crop can be stored and used as food for many months. There must be an explanation for this. The Potato acreage on farms is to be extended considerably and heavy supplies of this vegetable are expected, so garden supplies can be reduced without running much risk.

In deciding on other vegetables to grow it must be remembered there are four seasons in the year—summer, autumn, winter and spring—and supplies are needed in each. For the summer there should be crops of the health-giving salads and Spinach; the body-building Beans and Peas, and nutritious early Carrots and Cauliflowers. In the autumn, Cabbages, Brussels Sprouts, Runner Beans, etc. It is easy to produce an abundance in these two seasons and wastage often occurs. This surplus in summer and autumn is very wasteful and could be avoided by careful planning.

Supplies for winter and the spring are more difficult to secure, but can be achieved by planning. There are the root vegetables—Potatos, Parsnips, Beetroots, Carrots, Swedes and Onions, and these can be stored and used throughout the winter period. Of these, mention should be made of two—the Carrot and the Onion.

The Carrot is good food, a very rich source of vitamins and it should be eaten in abundance, yet supplies are often scarce and dear to buy. In peace time imports, mainly from Belgium and Holland, account for about 50 per cent. of our requirements, and if these fail to arrive during the war period, Carrots will be scarce unless more are grown in the gardens.

The Onion is a popular vegetable with English people, yet less than 10 per cent. of our requirements are home grown. Imported Onions—ten million bushels costing over one million pounds—are brought annually from Spain, France, Holland and Egypt; but it is certain that nothing like this full quantity will reach England during war-time.

The Onion is a good food, possesses aromatic oils for flavouring purposes and has its uses for many purposes. The flatter types of Onions keep best and are more useful during the war period.

At present the value of food is not measured entirely in terms of starch and proteins, and where vegetables are considered the nutritional experts pay even more attention to the minerals and vitamins they supply to the system. For this reason, the importance of green vegetables is stressed and particularly so during the winter months. The green colour is given to vegetables by the sunlight and this gives the vegetables their special virtue, so that they tone up and keep the human system right. Green vegetables are needed most when the days are short and the sunlight of low intensity, for which reason there should be grown in every garden a patch of green vegetables to be used after Christmas and all kinds must be hardy of wind, frost, snow and rain. Such a patch should contain the late winter Cabbage, the latest Savoys, hardy Kales and Purple Sprouting Broccoli. The demonstrations of these by the Royal Horticultural Society at Wisley this spring has been very much appreciated.

By planting such vegetables late in the summer these green vegetables maintain a supply until the crops of spring Cabbages and Spinach come to herald in the spring, and so the cycle is completed. The seeds of French Beans or the White seeded (Haricots) can be grown specially for winter use. Time will not allow of the consideration of other vegetables, each has its virtues and each provides a welcome change.

My gardening friends tell me that they grow sufficient vegetables for their households in normal times, and that if production is increased there will be a surplus after the needs of the household have been met. If during the war period we could eat more vegetables, Peas and Beans and less cereals and meat, the demand on shipping would be lessened considerably and probably our health would also improve. A welcome change in the national diet could quickly absorb this surplus. If there is a seasonal surplus in some gardens there are also families where the man has gone to the war and other families without a garden, and these would be glad of your surplus! This surplus should not be wasted but handed to those in need of it.

Stage by stage the Army grows bigger as men are called up. In some cases the men have left a family, a garden or allotment. It would seem a kindly act for Horticultural and Allotment Societies to make a register of the plots and gardens occupied by soldiers on Active Service and to arrange for the cultivation and cropping of these whilst the men are away. The families will be glad of the vegetables, and the kindly act be worthy of the best tradition of gardeners.

Food production is a very serious matter and any shortage would be disastrous for the nation and for the individual, for which reason all should cultivate either a garden or an allotment and so grow as much food as possible.

Finally a word on lawns and flower beds. During periods of stress the human race is apt to take extreme views and often to

do unnecessary things, which presumably explains why some people advocate the destruction of lawns and flower beds.

I prefer to keep this land in reserve, if need be, for another year ; but for the present let the flower beds and the lawns continue to give their pleasure. There is little to be had elsewhere. Every work of beauty has been covered up and every street disfigured with horrid sandbags, so everywhere ugliness abounds. The lawns and flowers are needed to correct our perspective and to maintain our morale. All garden lovers will be wise in continuing their culture. Those that take this course will see to it that the vegetable harvest is adequate.

DAPHNE SOPHIA.

By T. HAY, C.V.O., V.M.H.

IT seems worth while recording the flowering of this Daphne as I can find no trace of the plant having ever been in cultivation here, and it may be that for the first time away from its habitat in south-west Russia this lovely species opened its flowers, during the early days of March, in a greenhouse in the very heart of London.

Daphne Sophia was described by Dr. KOLENICZENKO in the Bulletin de la Société Impériale des Naturalistes, Moscou, 1849. The description is less strictly botanical than is usually devoted to a new species, and Dr. KOLENICZENKO becomes enthusiastic in his praise of this Daphne, which forms a neat, shapely shrub about two feet in height. The branches terminate with a cluster of from six to eighteen flowers, pure white and very fragrant. The leaves are dark green, somewhat soft in texture, 2 to 3 inches long, and seem to be produced in more profusion round the flower heads, as if, as the doctor says, for their protection.

The plant has evidently some distinct characteristics not found in other species, as for instance the fact that the first flowers open in early spring with a second crop in August, while ripe fruits from the first flowering are present. The bracteoles persist and show how often the plant has flowered.

Dr. KOLENICZENKO further recommends this species as a precious ornament for gardens ; it grows luxuriantly on very friable land on the slopes and summits of chalky mountains in the state of Kursk, in the district of Bielgorod, and several other stations are given.

I am greatly indebted to an official of the Moscow Parks Department for this plant ; his generosity in sending several dozen plants was highly appreciated, but his packing was of the worst ; none of the first consignment was alive on arrival, and the plant that has flowered here was a special pot-grown specimen that reached London safely about a year ago.

I have to thank A. D. Cotton, Esq., of the Royal Botanic Gardens, Kew, for sending me a copy of Dr. Koleniczenko's account of this Daphne.

PLANTS TO WHICH AWARDS HAVE BEEN MADE IN 1940.

Cymbidium × 'Ramboda' var. 'Invincible.' A.M. March 5, 1940. A robust plant which bore two spikes, with ten and seven flowers respectively, mainly of apple-green colour, the labellum marked with crimson-red. Raised and exhibited by Messrs. J. & A. McBean, Cooksbridge, Sussex, the parents being *C. × 'Venus'* and *C. × 'Pearl.'*

Cymbidium × 'Ramboda' var. 'Colossal.' A.M. March 19, 1940. A vigorous plant which bore an arching spike of twelve large flowers, in colour greenish-buff, the expansive labellum somewhat lighter and profusely spotted with red. The result of crossing *C. × 'Venus'* with *C. × 'Pearl.'* Raised and exhibited by Messrs. J. & A. McBean.

Laeliocattleya × 'New York' var. 'Illimani.' A.M. March 5, 1940. This plant bore a spike of two well-formed and pleasing flowers, which are pure white, except for some orange-yellow colour in the throat area of the labellum. Raised and exhibited by Baron Bruno Schröder, The Dell Park, Englefield Green, Surrey, the parents being *Laeliocattleya* × 'Aconcagua' and *Cattleya* × 'Maggie Raphael' *alba*.

Narcissus 'Aranjuez.' A.M. April 2, 1940. A neat, well-formed, medium-sized *Incomparabilis* variety (Division 2a) for exhibition, with flowers 3½ inches in diameter, well poised on 19-inch stems. The canary-yellow segments were smooth, broad, overlapping, rounded, and 1½ inch long. The cup, which was deep lemon at the base with a wide marginal band of orange, was ½ inch long and 1½ inch in diameter at the slightly pleated mouth. Raised by Messrs. Warnaar & Co., Sassenheim, Holland, and shown by Mr. J. L. Richardson.

Narcissus *Marvieri*. A.M. March 19, 1940, as a plant for the alpine house. A charming little yellow-flowered species from Morocco which has been described as a yellow copy of *N. Watieri*. As exhibited, however, it was rather larger than *N. Watieri*, being 6½ in. high with flowers 1½ inch in diameter. The perianth segments were narrower than those of *N. Watieri* and the foliage more erect. Shown by Dr. P. L. Giuseppi, Trevoose, Felixstowe.

Odontioda × 'Astoria' var. 'Gloria.' A.M. March 5, 1940. A charming hybrid which bore an arching spike of fifteen well-formed flowers, rose-pink with slight reddish spotting on the central area of the segments. Raised and exhibited by Messrs. Charlesworth & Co., Haywards Heath, the parents being *Odontioda* × *Pittiae* and *Odontoglossum crispum*.

* **Primula malacoides** 'Dignity.' A.M. February 8, 1940. A robust variety, with freely produced flower spikes, fully 22 inches long, which are produced in succession. Flowers single, of good form,

* After trial at Wisley.

$1\frac{1}{2}$ inch diameter, H.C.C. Orchid-purple 31/1; eye H.C.C. Indian yellow 6/2. A good even stock. Raised and sent by Messrs. Sutton & Sons, Ltd., Reading.

* **Primula malacoides 'Mauve Queen.'** H.C. February 8, 1940. Plant of vigorous habit, with freely produced flower spikes 18 inches long. Flowers single, $1\frac{1}{8}$ inch diameter, H.C.C. Orchid-purple, 31/1; eye H.C.C. Indian yellow 6/2. Raised, introduced and sent by Messrs. Sutton & Sons, Ltd., Reading.

* **Primula sinensis 'Double Charm.'** A.M. February 8, 1940. Plant of vigorous habit with rather small foliage and freely produced flower trusses, well above the foliage. Flowers semi-double, $1\frac{9}{16}$ inch diameter, fimbriated, soft salmon-pink. A true even stock. Raised, introduced and sent by Messrs. Hurst & Sons, 152 Hounds-ditch, London, E.C.

* **Primula sinensis 'Scarlet King.'** A.M. February 22, 1940. The plant is of vigorous habit with medium-sized foliage; flower trusses freely produced, well above the foliage. Flowers single, $1\frac{1}{8}$ inch diameter, fimbriated, petals somewhat wavy, a deeper and richer shade of Turkey red (H.C.C. 721); eye of medium size, Uranium Green (H.C.C. 63/2). A true, even stock. An improvement in colour and form on 'Crimson King.' Raised and sent by Messrs. Sutton & Sons, Ltd.

Rhododendron × 'Maya.' A.M. March 5, 1940. A hardy flowering plant for the woodland garden. The loose trusses are composed of ten to twelve funnel-shaped flowers about $2\frac{1}{2}$ to 3 inches broad by 2 to $2\frac{1}{2}$ inches deep. These are very pale mauve within, spotted lightly with deep purple and blotched with a more intense shade of purple at the base of the tube. The outside of the flower is flushed with a deeper shade (H.C.C. 633/3). The narrowly obovate leaves are up to 7 inches long by about 2 inches broad, dull green, glabrous and pale beneath. *R. × 'Maya'* is a hybrid between *R. sutchuenense* and *R. Rirei*, and was exhibited by E. J. P. Magor, Esq., Lamellen, St. Tudy, Bodmin, Cornwall.

Vuylstekeara × 'Armanda.' A.M. March 19, 1940. This elegant hybrid bore an erect spike of six flowers, the sepals and petals ruby-crimson, the expansive labellum whitish and having a dark crimson basal area. The result of crossing *Vuylstekeara × 'Melba'* with *Odontoglossum × 'Neron.'* Raised and exhibited by Messrs. Charlesworth & Co.

Vuylstekeara × 'Redskin' var. 'Artona.' A.M. March 5, 1940. This interesting hybrid bore a spike of eight large flowers, of brownish-crimson colour, the expansive labellum much spotted with crimson-rose. Raised and exhibited by Messrs. Charlesworth & Co., the parents being *Vuylstekeara × 'Leda'* and *Odontonia × 'Latona.'*

* After trial at Wisley.

IN THE LINDLEY LIBRARY.—III.

AN EARLY BOOK ON ALPINE PLANTS.

By R. E. HAY.

GARDENERS have the name of being conservative folk, unwilling to put aside that which has been well tried and tested for a new idea or unknown quantity ; but this is only partly true, or, alternatively, true only of some gardeners. Even those most rooted in the customs and fashions of the past are intrigued by the arrival of a new plant, but not all are so willing to embrace new methods of cultivation or unheard-of styles of gardening. But if the progress of gardening over the past hundred years is reviewed the changes of fashion that each decade has brought are surprising.

At the present time “ tree and shrub gardening ” is gaining yearly in favour, and this enthusiasm has quite probably been due to a large extent to the intense efforts to secure “ natural ” effects that have been made by devotees of alpine gardening. And the extent of the change of fashion in alpine gardening itself is an interesting study.

What is apparently the first book in the English language to be devoted solely to alpine plants was written by JAMES LOTHIAN, gardener to W. A. CAMPBELL, Esq., of Ormsary. The book, which is entitled “ Practical Hints on the Culture and General Management of Alpine or Rock Plants,” is undated, but from contemporary publications it is learned that it appeared in 1845 ; it was produced by a firm of publishers in Edinburgh and also published in London and Dublin.

Apart from the interest which attaches to it as the forerunner of the many classic works upon the subject, culminating, of course, in the two volumes of FARRER’s English Rock Garden and SAMPSON CLAY’s supplement, it is worthy of perusal by all interested in this important branch of gardening. The word “ perusal ” is used advisedly because the book has become exceedingly scarce and, although copies do occasionally come into the hands of antiquarian booksellers, they do so at long intervals and the price asked for them is based more upon their rarity than their value to the student of alpines ! Thus a visit to the Lindley Library will probably be the quickest way of becoming acquainted with the book.

Although only consisting of eighty-four pages, measuring 6½ inches by 4 inches, and containing four coloured plates of alpines, two plates in black and white of suggested plans for rock gardens and a delightfully engraved, vignetted illustration on the title page, it has considerable charm as an example of the leisureed and thoughtful production that characterizes books of the early nineteenth century.

How gratified LOTHIAN would be to-day if he could know that his adjurations to the ladies in his preface have had such profound effect ;

he believed that "There is no class of plants more worthy the attention of Ladies, as they are, in themselves, very interesting and beautiful ; and when once a collection is formed, the major part of them are easily managed, as they do not, like many other families of Plants, require the application of manures and composts, or any extra labours which Ladies could not well overtake."

LOTHIAN's ideas upon the building of rock gardens and the materials used therein are to modern devotees of the art rather amusing. The idea of associating plants with certain rocks, or even of discriminating between different kinds of stone, had not been born then. LOTHIAN boldly states : "In the formation of the Rockery, there are other objects to be attained besides the imitation of nature. The rock-work must be so constructed as to insure the preservation and successful growth of the plants. . . . And it should always be kept in view, to make it of the most fanciful structure, so as to show off the different kinds of plants by which means it has the most effective display and appearance." Curiously shaped and water-worn stones, and geological curiosities, were all desirable and should be placed in prominent positions in the rock garden. A pond, of course, was a prime necessity.

It is an interesting reminder of the times that LOTHIAN lived in that the duty on glass had only just been removed at the time the book was published, and LOTHIAN views this abolition with pleasure, since he foresaw a greater use of glass for frame sashes than had previously been possible.

Of the plants he recommended for culture in the rock garden, many are by no means common to-day, and several have been lost and found again since 1845. He knew practically no Asiatic Primulas or Saxifrages, but his lists of plants contain a large and varied assortment of alpines that even after nearly a hundred years are still spoken of with respect by rock garden enthusiasts. *Triptilion spinosum* and *Trifolium uniflorum* are two that disappeared from gardens for many years.

The list given at the end of the book of Mosses and Liverworts suitable for cultivation in the rock garden strikes an unfamiliar note. Mosses are seldom cultivated to-day in rock gardens, but in LOTHIAN's time their inclusion was warmly recommended.

As so often happens, one is driven to admire the confident, forthright opinions expressed by the authors of nineteenth-century gardening books, and the following paragraph from the last page of LOTHIAN's text gives us a vivid glimpse of one of those fine old Scottish gardeners, confident in their experience and holding fast to their beliefs : "I have now done with the subject, and have given what I know, and have practised, regarding the culture of alpines and if others would do the same it might prove the means of elucidating the treatment best adapted for this tribe of plants generally."

SOME PLANTS IN THE SHOW.

March 6, 1940.

MR. T. HAY who gave the talk on this occasion mentioned a number of interesting plants, including *Primula denticulata*, which he affirmed is undoubtedly the best and most lasting of all Primulas for the town garden. He said : " We grow thousands of Primulas for the Parks in about ten species but, with the exception of *P. denticulata*, they only flower once and are of no further use to us, while *P. denticulata* flowers year after year and makes huge clumps. It may be that the leaves are a trifle coarse, but the ball-shaped flower heads are very showy ; they are obtained in shades of lilac, purple, pink and pure white. It is a native of Kashmir, where it grows by the million in wet places by the lakes and rivers.

" I had Tulip ' Keizerskroon ' brought to our meeting because it is one of the oldest garden-raised plants in cultivation ; it appeared on this earth long before any of us and looks like surviving us all. It was first offered for sale in Holland in 1680 and is still grown by the million, as vigorous as ever and as popular. The Dutch growers never can get enough of it. Very few florists' flowers ever become centenarians : ' Keizerskroon ' is a noble exception. Some may not admire its somewhat barbaric colouring, but it has a great host of admirers all over the world.

" *Notholirion Thomsonianum* is a member of a small group of plants closely allied to the Lilies ; there are only four species. There is a number of more or less minute differences between them and the true Lilies and they have given much trouble both to botanists and to gardeners, as they have at various times been named *Lilium*, *Fritillaria* and *Notholirion*, but it looks as if this distinguished quartet are now to remain Notholirions for good. They are not very suitable for outdoor cultivation as the long and not very attractive leaves grow during the winter and are generally damaged by frost. They are more suitable for pots and the cool house. The little bulb after it has flowered generally disappears but leaves plenty of small progeny that must be carefully looked after until they all attain flowering size. Although I had the honour of introducing one of the four species to cultivation it gave me no great thrill, as I am not yet convinced that Notholirions are worth all the fuss Lily enthusiasts make of them.

" *Tecophilaea cyanocrocus*, a lovely little plant, was discovered in Chile in 1862 by a German botanist ; it occupies a rather restricted area in its native country and is found sparsely spread about, never in huge masses. This is, no doubt, the reason why we still see so little of it at flower shows and in gardens, and it also accounts for its high price. It is rather difficult to grow and keep, one of the troubles being that it is inclined to start into growth very early in the year, so it should be

treated as a cool greenhouse plant where all its little peculiarities can be catered for. There is another species which is not quite so beautiful as this, but it is more plentiful in its native habitat and was at one time very common near Valparaiso, so if any of you have friends near that city give them a hint that you would appreciate a good boxful.

"The genus *Forsythia* greatly interests me as it was named in honour of a Scot who held the same post as I do—Superintendent at Kensington Gardens. He had, however, more claim to fame than your humble servant, as he invented something which he managed to persuade the Government of the day would cure diseased branches of trees—he received from both Houses of Parliament a vote of thanks and a gift of money!"

"The plant named in his honour *Forsythia*, especially *F. intermedia* var. *spectabilis*, has proved more lasting than his tree medicine and it brightens every London park and square with its glorious mass of flowers in early spring. I can think of no more accommodating shrub, and as a town shrub it is perhaps the most perfect of all, as it seems to thrive under any conditions. The *Forsythia* is also very suitable as a wall plant and seems to be equally happy no matter in which direction the wall faces. In London I find it useful and free flowering, whether it has a north, south, east or west aspect. It will also stand gentle forcing and can be tried in flower in a warm greenhouse during late January or February. It is easy to grow, easy to propagate and cheap to purchase—can I say anything more important in its praise?"

BOOK REVIEWS.

"The Enigma of the Origin of Monstrosity and Cristation in Succulent Plants." By J. J. Verbeck Wolthuys; translated by J. A. Schuurman. 8vo. 36 pp. Ill. (Joh. Enschede en Zonen, Haarlem, Holland, 1939.) 2s.

The study of succulent plants is in itself fascinating, and the cause of monstrosities which from time to time appear or have been perpetuated has already been the subject of considerable conjecture and theorizing. The author discusses some of the theories that have been advanced to account for these occurrences, and comes to the conclusion that little real progress has been made towards the elucidation of the causes of malformation. The booklet is written in Dutch on the verso and English on the recto pages.

"Good Food without Meat." By Ambrose Heath. 8vo. 108 pp. (Faber & Faber Ltd., London, 1940.) Price 3s. 6d.

This is a valuable little book at the present moment and should help many a harassed housewife to solve the problem of satisfying but meatless meals. Many of the recipes are within the reach of the most moderate purses although there are a few sufficiently Lucullan to grace the victory feast. Here are vegetable dishes for all seasons of the year, cheese dishes in plenty, and such a variety of omelettes as must provide new ideas to most English tables. Here, too, are new combinations of ingredients such as curried eggs and lentils, macaroni with cauliflower and many others. The recipes given in this little book range from those suitable for light luncheon dishes to complete meals, and it is safe to say that in this latest of Mr. Ambrose Heath's cookery books there is something new for every taste and palate.

"Good Breakfasts." By Ambrose Heath. 8vo. 118 pp. (Faber & Faber Ltd., London, 1940.) 3s. 6d.

The number of different ways of cooking eggs described by Mr. Heath will come as a revelation to those whose imagination is bounded by the egg fried, boiled, poached or scrambled! Mr. Heath has rendered useless any complaint of a dearth of variety at the breakfast table.

"Cook what you Grow." By W. E. and Irene R. Shewell-Cooper. 8vo. viii + 95 pp. (English Universities Press, London, 1940.) 6d.

A collection of recipes for cooking garden produce.

"Gardening on Chalk and Lime Soil." By Robert Jackson. 8vo. 213 pp. Ill. (Williams & Norgate, Ltd., London, 1940.) 5s. 6d.

"Gardening on Chalk and Lime Soil" by R. Jackson is a book devoted entirely to gardening on these soils. The chapter on the maintenance and improvement of the soil is useful and well set out, showing how necessary it is to prepare the soil well by double digging and manuring. The other chapters are concerned with the flower garden, bulbous plants, the lawn, Roses and trees and shrubs, etc., advising the reader which plants will grow on lime soils and those which will not. Such assertions are always hazardous, especially with regard to plants on lime and chalk soils. The plants mentioned in these lists do not entirely agree with the experience of the writer of this review. If the author had had experience of growing the Evansia group of Iris, he would not say these Irises were intolerant of lime. *Iris japonica*, *I. confusa* (syn. *I. Wattii*) and *I. tectorum* all grow to perfection on lime or chalk soils, and the only Irises of this group which dislike lime are *I. gracilipes* and the rare *I. speculatrix*; again with regard to Lilies the author suggests *Lilium tigrinum* will grow well on chalk or lime soil. *L. tigrinum* is one of the Lilies that will not tolerate lime at any price, nor do *L. Willmottiae* or *L. umbellatum* do well on lime soils. Other bulbous plants which are said by Mr. Jackson to be intolerant of lime are *Amaryllis Belladonna*, *Crinums* and *Nerines*; these bulbs have grown splendidly in the writer's garden for many years in very chalky soil. Readers are advised that such plants as *Gazanias*, *Dimorphothecas*, *Tradescantias* and *Hollyhocks* are not recommended for lime soils, but as a matter of fact they all grow well on chalk or lime soils and even seed themselves freely in favourable years.

It is a pity that a book which contains much useful information is marred by these errors. The book is well printed and of a handy size.

F. C. STERN.

"Children's Gardens." By Edwin L. Howard. 8vo. 64 pp. Ill. (The Studio Publications, London, 1940.) 2s. 6d.

The obvious praise for this book would be that it should encourage the love of gardening in children while their minds are at the most impressionable stage. However, the gardening theme proper has been overshadowed by the idea prevailing throughout the book of making the children's own particular plot a playground. This would not matter if it were not overdone, but one feels that the additional attractions of toy animals, boats, teepees and other accessories are too elaborate and likely to divert the children's interest from the garden itself. Nevertheless, chapters on window boxes inside and outside are sound and helpful.

"Grow it Yourself." By Percy Izzard. 8vo. v + 123 pp. (Associated Newspapers Ltd., London, 1940.) 1s.

This little manual is good value and should be intelligible and useful to even the merest beginner.

"Vegetable Crops under Glass." By W. F. Bewley. 8vo. 31 pp. (Country Life Ltd., London, 1940.) 6d.

An informative booklet giving sound practical advice by the acknowledged authority on the subject. Useful in peace, invaluable in war time.

"Feeding the People in War-time." By Sir John Orr and David Lubbock. 8vo. vii + 88 pp. (Macmillan & Co., Ltd., London, 1940.) 1s. 6d.

This is a little book that ought to be in the hands of every Member of Parliament and of every higher officer of the Ministries of Food and Agriculture. It sets out in brief and comprehensible language the necessary elements of a

food policy for a nation at war, the principles that should govern rationing on the one hand and home production on the other. To sum up the argument, the essentials are cheap bread, cheap milk and Potatos and more vegetables, either domestically grown in gardens and allotments or cheapened in distribution. Costs should be reduced by organizing distribution ; the authors favour depots from which people can buy on the " cash and carry " basis.

The book gives the minimum information necessary about the nature of food and the peace-time dietary of the nation, and then goes on to explain how this dietary, governed in the first instance by liking and price, must be modified when the country is put on short commons by war. It is not merely a matter of cutting down in quantity, large sections of the community cannot cut down without losing working efficiency and courage : it is a matter of readjustment. Shipping, distribution, agriculture all come into the picture, psychology and propaganda also.

This should be " everyman's " book at the present time.

" Flowering Shrubs of California and their value to the Gardener." By Lester Rowntree. 8vo. xii + 317 pp. Ill. (Humphrey Milford : Oxford University Press, London. 1940.) 18s. 6d.

This new book by Lester Rowntree is a pendant to her volume on the Californian flowers which appeared some few years ago. Even when that book was on the stocks she talked to me of this one which was already mapped out in her mind, and now here it is, a most informative and amusing book with all those little wisecracks and touches of humour that made her first book so readable. She has the art of imparting knowledge in a light fashion that makes one remember what she says far more than if she solemnly read a lecture on the matter. There are thumbnail sketches of incidents and her description of the rattlesnake's warning note is excellent—I have heard it myself and fled—" If he did not frighten me so much I would be better able to admire his beauty and clever protective colouring of chrome and tan. . . His warning is like the rattle in Haydn's Symphony for Toy Instruments. . ." Naturally a large part of the book deals with the Ceanothus family of which there are over 60 species and varieties voluptuously clothing the sides of the Sierras and overflowing into the valleys below. Then follow the " Manzanitas " named after the Spanish of " little apples " but which over here are called Arctostaphylos : they too are a large family and one of the glories of California with their mahogany hued bark and queer contorted shapes softened by the soft grey foliage and the loveliness of their urn-shaped pink and white flowers. She touches on those things we treasure here as rarities but which are every day occurrences in those parts of California where they grow—*Romneya Coulteri*, *Dendromecon rigidum*, *Carpenteria californica*, *Fremontias*, *Garrya elliptica* and engaging shrubby *Pensetmon antirrhinoides* with its yellow blossoms overtopping masses of the Mimulus that abound out there. To me the book is of great interest as I have wandered up and down California with her twice on plant hunting trips, covering one way or another something between two and three thousand miles and reaching from Carl Purdy's home well north of San Francisco to Jacumba on the Mexican border. Nobody who has not seen California can have the faintest idea of its loveliness and the prodigality of its flora, but this book and its predecessor give the untravelled reader an excellent glimpse of it all.

I love her " wisecracks." In one place she says drily " Pruning is an adjustment between man and his shrub or tree, a compromise which should bring out the best beauty of the subject and at the same time guide it to fit into its present home. . . It is generally approached from the human side only, the shrub's standpoint is seldom considered. . . A knowledge of form and line and colour is just as necessary to the pruner as to the landscape architect." On plant collecting she says " And always collect with intelligence and not with greed." An axiom that many collectors might lay to heart ; and finally this passage on the American attitude to native plants made me laugh, it is so painfully true. " Most American-born shrubs like American-born musicians have been obliged to make their debuts in Europe and to work gradually homeward, marking time until their native public is ready to welcome them with open arms." A pithy comment on the mentality that sees no good in the homely things on its own doorstep.

I would like to go on quoting from this delightful volume but paper restrictions forbid verbosity, so all I will say is " buy the book and you will not regret it."

JOURNAL OF THE ROYAL HORTICULTURAL SOCIETY

Vol. LXV



June 1940

THE SECRETARY'S PAGE.

RED CROSS SALE.

ATTENTION is drawn to the Red Cross Sale leaflet accompanying this JOURNAL.

Fellows and Associates should assist by letting the Secretary have early information of what support they may be able to give, using the reverse side of the leaflet and returning it to him.

In particular it is hoped that Fellows who possess old botanical books, especially those with coloured plates, and who would be willing to present them to the Society for this sale will communicate with the Secretary as soon as possible, as the catalogue must be prepared in good time.

CALENDAR.

A Fortnightly Show will be held on June 4 (12 noon to 6.30 P.M.) and 5 (10 A.M. to 5 P.M.) at which the special feature will be Irises.

At 3 P.M. on June 4, Mr. B. R. LONG will give a lecture on "Tall Bearded Irises of Yesterday and To-day."

A talk on "Some Plants in the Show" will be given by Mr. T. HAY at 3 P.M. on June 5.

The second Fortnightly Show in June will be held on June 18 (12 noon to 6.30 P.M.) and 19 (10 A.M. to 5 P.M.) and the special features at this Show will be Cacti and Succulents, and Violas and Pansies. Classes for Flowering Shrubs will also be held on this occasion as follow :

Class A.—8 varieties of hardy shrubs in bloom, not more than 2 of any one genus.

First prize, £3; Second, £2 5s.; Third, £1 10s.

Class B.—1 vase of a hardy shrub in bloom.

First prize, £1; Second, 15s.; Third, 10s.

At 3 P.M. on June 18, Mrs. FRANCES PERRY will give a lecture on "Water Plants and Water Gardens."

At 3 P.M. on June 19 a lecture will be held under the auspices of the Institute of Landscape Architects, and Fellows are invited to attend.

The first Fortnightly Show in July will be held on July 2 (12 noon to 6.30 P.M.) and 3 (10 A.M. to 5 P.M.), the special features at this Show being Lilies, Delphiniums and Sweet Peas.

Classes for Lilies will be held on this date as follow :

Class A.—3 species and/or hybrids of Lilium, 1 stem of each, cut or on plant.

First prize, £1 10s.; Second, £1; Third, 15s.

Class B.—1 stem of Lilium, cut or on plant.

First prize, £1; Second, 15s.; Third, 10s.

A Banksian Medal is also offered on this occasion to the amateur who exhibits at this Show or on July 16 and 17 the best hybrid Lily which has not previously received a Certificate of Preliminary Commendation, an Award of Merit, or a First-class Certificate. All entries for this medal must be made on forms obtainable from the Secretary, by whom the completed forms should be received not later than by the first post on the morning of the Show, but earlier if possible.

A talk on "Some Plants in the Show" will be given by Mr. W. M. CAMPBELL at 3 P.M. on July 3.

A Fortnightly Show will be held on July 16 (12 noon to 6.30 P.M.) and 17 (10 A.M. to 5 P.M.) at which the special feature will be Border Carnations, and classes for Lilies will be held as follow :

Class A.—6 species and/or hybrids of Lilium, 1 stem of each, cut or on plant.

First prize, £2; Second, £1 10s.; Third, £1.

Class B.—1 stem of Lilium, cut or on plant.

First prize, £1; Second, 15s.; Third, 10s.

The Clay Challenge Cup is also offered on this date to the raiser of a Rose of good form and colour, not in commerce before the current year, and possessing the true old Rose scent such as may be found in the old Cabbage or Provence Rose, in 'General Jacqueminot,' 'Marie Baumann,' 'Duke of Wellington,' 'General McArthur,' etc. The scent known as "Tea Rose" is not, for the purposes of this competition, to be counted the true old Rose scent. Not more than three different varieties may be shown by one competitor, but at least three and not more than six blooms or trusses of each variety will be required, together with a plant in flower and in bud. The cup will be awarded

only once for the same Rose. This competition is open to trade and amateur growers and entries must be made on special forms obtainable from the Secretary, to whom the completed forms should be returned not later than by the first post on the Wednesday preceding the Show.

A talk on "Some Plants in the Show" will be given at 3 P.M. on July 17 by Mr. C. H. CURTIS.

A Fortnightly Show will be held on July 30 (12 noon to 6.30 P.M.) and 31 (10 A.M. to 5 P.M.).

At 3 P.M. on July 30 a lecture will be given by Mr. J. E. GRANT WHITE on "The Naturalisation of Plants in the Garden."

At 3 P.M. on July 31 a talk on "Some Plants in the Show" will be given by Mr. G. W. ROBINSON.

PRACTICAL DEMONSTRATIONS AT WISLEY.

Demonstrations will be held at Wisley on the following dates, weather permitting, and in order that arrangements may be made those Fellows desiring to attend should notify the Director of the Gardens beforehand :

June 5-6 (2 to 4 P.M.). Summer Pruning of Shrubs.

July 17-18 (2 to 4 P.M.). Summer Pruning of Fruit Trees.

LILY GROUP.

The programme for the Lily Group during June and July is as follows :

Tuesday, June 18.—Question and Answer Meeting at 4 P.M. in the Restaurant of the Old Hall in Vincent Square.

Saturday, July 6.—Visit to the Royal Botanic Gardens, Kew.

Tuesday, July 16.—Discussion at 3 P.M. in the Lecture Room of the New Hall in Greycoat Street on the Lilies exhibited.

At 7 P.M. Members of the Lily Group and their friends will dine together in the Restaurant of the New Hall.

EXAMINATIONS.

The practical portion of the Teachers' Examination in School and Cottage Gardening will take place on June 6 at Wisley.

The Preliminary Practical Examination for the National Diploma in Horticulture will take place at Wisley from June 10 to 14, and the Final Practical Examination for this Diploma will take place at Wisley from June 17 to 20.

WISLEY IN JUNE.

JUNE is a month of flowers, a fact which is everywhere reflected in the Gardens, but especially perhaps in the Trials and standard collections on the hill, in the rock garden and in the wild garden, Seven Acres and Howard's Field, where are the principal plantings of shrubs. Unfortunately the toll taken by the abnormal winter has left many gaps which can hardly be filled by one season's growth ; the Cistuses in Howard's Field and by the Alpine House, some of the old specimen shrubs on the wall of the Laboratory, the taller Heaths, the New Zealand Veronicas, and many of the garden Pinks are examples.

First visiting the greenhouses, we find in the Half-Hardy house the attractive and long-blooming Barberton Daisy, *Gerbera Jamesonii* with buff-yellow or rose-red flowers, the pink spikes and silver-grey foliage of the shrubby *Ebenus cretica*, the bushy pink-flowered *Pimelea ferruginea*, pale blue *Oxypetalum caeruleum* from South America, and, perhaps, the conspicuous fiery orange heads of the climbing *Mutisia decurrens*, so rarely seen flourishing in gardens. A large collection of Pelargoniums is growing in the second house, as well as some Calceolarias.

The Fuchsia species will be among the most prominent shrub groups represented in the large Temperate house, including *F. corymbiflora*, *F. parviflora*, and *F. serratifolia*, the first most brilliant in colouring, besides a large number of garden hybrids. Other notable plants include the South African Bird-of-Paradise flower, *Strelitzia Reginae*, the useful pot plant *Rehmannia angulata* with rose-purple flowers, *Cestrum aurantiacum* with tubular flowers resembling an orange Buddleia, the handsome climbing *Lonicera splendida* on the east side of the house, together with a selection of Regal Pelargoniums now not common in gardens.

In the section devoted to the Trials and standard collections the following flower this month : Shirley and Iceland Poppies, Lupins, Sweet Williams, Delphiniums, Roses, Irises, Paeonies, Pyrethrums and Hemerocallis. The last mentioned will be found behind the herbaceous border and not with the other Trials on the hill, while the Paeonies are planted around the Pear orchard and can conveniently be seen on the way to the Alpine house. Special mention should be made of the Rhododendron and Azalea trials now well established on the northern side of Battleston Hill above the Dahlia trial ground.

Both in the Alpine house and in the rock garden there is a great variety of plants in flower. In the former visitors will find species of Dianthus, Lewisia, Saxifraga (the late-flowering *S. Cotyledon* in several forms, and *S. longifolia* 'Tumbling Waters'), Campanulas, *Phlox mesoleuca*, *Silene Ingramii*, and the shrubby *Gilia californica* with deep rose, white-eyed flowers, to enumerate only a few of the plants culti-

vated under these conditions. Outside in the adjacent beds the collection of *Helianthemums* is flowering, although some of them have suffered badly from the effects of the winter and low temperatures and may therefore not be as showy as usual.

From the galaxy of plants on the rock garden we can only pick out a few for special mention : the Geraniums headed by *G. subcaulescens* and *G. Farreri*, species of Iris such as *I. Douglasiana* and the lavender-blue *I. tectorum* from Japan, the rich, true blue of *Lithospermum diffusum* var. *erectum*, Ramondias in a shady crevice, *Dianthus* 'Icombe Hybrid' with notably large pink flowers, *Nomocharis* among the dwarf Rhododendrons, and two outstanding shrubs, *Genista lydia* covered with small bright yellow blooms, and the more or less prostrate *Rhododendron indicum* var. *balsaminaeflorum* (*Azalea rosaeflora*) equally bedecked with countless, semi-double, salmon-pink flowers. In the bog garden *Crinum riparium* is very noticeable with its stout stem and head of long pink and white funnel-shaped blooms, and, of course, the multi-coloured Japanese Irises along the banks of the pond cannot be overlooked.

June is the first month when Lilies flower, and in the Wild Garden grow *L. rubellum* (see Fig. 51) with rose-pink trumpets, the handsome yellow *L. Szovitsianum* from the Caucasus region, *L. umbellatum* which offers no difficulty to cultivators, and *L. pyrenaicum* of unpleasing scent but undoubtedly vigour. In the same area will be found the blue Poppy, *Meconopsis betonicifolia*, and other members of the genus, species of Primulas including *P. helodoxa*, *P. pulverulenta*, and the hybrids 'Red Hugh' and 'Chunglenta' derived from the latter. The Azaleas and Rhododendrons form large patches of colour in several corners, giving out in the case of many of the former especially the hybrid *Rhododendron azaleoides*, a welcome fragrance in the latter part of the month. Some other excellent shrubs are the pink *Kalmia latifolia*, the 'Mountain Laurel' of North America, *Magnolia Sieboldii* (*parviflora*) and *M. Watsonii*, of Japanese origin, with large and remarkably sweet-scented blooms, and the bigeneric hybrid *Gaulnettya* with clusters of pearl-like, white flowers followed later by purple-black fruits.

Passing out into Seven Acres numerous shrubs can be seen in flower. They include species of *Berberis*, *Cotoneaster*, *Spiraea*, *Deutzia*, *Philadelphus*, and many more, of which *Buddleia alternifolia* with pendent branches laden with purple clusters, and the hybrid Escallonias such as 'Donard Seedling' are particularly worthy of notice. The Pyracanthas, generally so smothered with blossoms, have suffered too severely during the winter to bloom much this summer. *Genista virgata*, or the very similar *G. cinerea*, is a June-flowering shrub which no garden other than the smallest should be without. The Water-lilies in the ponds are another feature of this period.

Those who are interested in the species of *Rosa* or in the old-fashioned Roses should make a point of walking through the Pinetum to Howard's Field, where large collections are planted beside the river walk. Additions have been made to both sections during the past

planting season, especially of the latter sorts, although it will be a year or more before these new plants will show their character and flowering capacity. In the meantime the older plants have been encouraged to give of their best by judicious pruning and manuring.

On the return journey a visit may be paid to the herbaceous border to see the progress of the plants and the earliest kinds to flower, or to the Award of Merit garden where specimens of *Genista virgata* and that very attractive Chinese Deutzia, *D. Monbeigii*, are now in full flower. The collection of Viburnum species close by is likewise of interest to cultivators of shrubs, and many of these also bloom at this time, although their chief value lies in the handsome clusters of fruits produced later in the year.

GARDEN NOTES

A DOUBLE YELLOW SNOWDROP.

AMONG other exhibits on the table set aside for small exhibits from Fellows at the Society's meeting on March 19 was a vase of a double yellow Snowdrop which attracted much attention. The ovaries were green and the widely spreading, white, outer segments were over an inch and a half from tip to tip. The numerous small inner segments, resulting from the multiplication of the usual three inner segments and the malformation of the stamens, were striped with yellow on the inner sides, the remnants of the anthers adding a touch of orange.

The plant was exhibited by Mrs. W. HEADLAM, who says that it was found in the garden of Heawood Hall, Cheshire, when her father, Sir GRAEME D. H. ELPHINSTONE, went to reside there about 1890. Some bulbs were given to Mr. S. ARNOTT, who, in the Journal of Horticulture, in 1912, referred to the variety as "the most beautiful of all double Snowdrops . . . which I call Lady Elphinstone." The plant has gradually found its way into the gardens of many lovers of Snowdrops, including that of Mr. E. A. BOWLES, who, writing of it in the Society's JOURNAL in 1918, said "This is a charming flower, and though in the first season after they have been replanted some will have green markings, it is fairly constant when undisturbed and has a very bright effect when fully open."

THE KITCHEN GARDEN IN JUNE.

THE main work of sowing and planting is usually completed by the month of June, and success with the vegetable crops depends to a great extent upon assiduous and thoughtful cultivation.

The importance of hoeing was stressed on this page in our last issue, and to that advice may now be added the recommendation to pay particular attention to watering such crops as may require it. It is most important that watering should be commenced in good time, before the plants show signs of distress, and also that the application should be sufficiently copious to soak the ground thoroughly. Following such waterings the ground should always be hoed as soon as the surface is again workable. Where regular watering is impossible or impracticable, much good may be done by the application of mulches, provided they are applied while the soil at the roots is still moist. For these summer mulches, heavy materials, such as rotted manure, should not be used, but dressings of a light character, such as that from an old hot-bed, mushroom bed or peat moss, will prove very beneficial.

Routine operations of staking Peas, Beans and other plants should be carried out before their need is urgent and a close watch must be kept for the incidence of diseases and attacks by pests. Danger to Peas from mildew can be averted by a timely dusting with sulphur; Turnip flea-beetle can be, to a large extent, prevented by dusting with Derris.

Provided the weather is congenial, planting of Marrows, Ridge Cucumbers and Tomatos may be carried out during the month, choosing warm, sunny situations. Those in the Midlands and the North will find the most suitable site for Tomatos against a sunny wall, but in southern counties good crops may be had from more exposed plantings.

Cauliflowers, early Broccoli, and Brussels Sprouts may be planted out during the month, and the planting of Celery and Celeriac should be completed. In dry weather trenches for Celery and the deep drills for Celeriac should be well watered and, if necessary, an overhead spray given during the evening. Sowings of Runner Beans and French Beans should be made, and also successional sowings of Radishes, Beet, Carrots, Peas, Turnips and Lettuces. A sowing of Chicory, early Endive and a row of Parsley for winter use may also be put in during the month. A sowing of late maturing Cabbage, such as Christmas 'Drumhead' or 'January King,' should be made early in the month.

Cutting Asparagus should be discontinued after the middle of the month on established plantations and a week or ten days earlier on young beds. Great care should be taken to keep the beds free from weeds, and a dressing of artificial fertilizer, rich in nitrogen and potash, 3 oz. to the square yard, is the best preparation for a good crop next year. The ground for planting Leeks, if not ready should

be prepared without further delay. A heavily manured site should be chosen.

Endeavour to hoe the ground between rows of Potatos at regular intervals prior to earthing up, which should be completed by the end of the month.

When three or four trusses of flowers have formed and the bottom truss has set on Broad Beans the growing tips should be pinched out.

The disbudding of outdoor Peaches and Nectarines is a most important operation. The underlying principle is to prevent overcrowding and to regulate the new growths to a number which can be conveniently tied to the trellis. Remove the growths which are growing straight out from the wall, and then thin the remainder until each one year old shoot possesses on the average three growths, one at the base, one at the top, and the other situated midway between those two. Do the disbudding gradually and not all at once. If a heavy crop of Peaches and Nectarines has set, the fruits must be thinned, starting when the fruits have reached the size of a Hazel nut. Thin gradually until the fruits are approximately 6 inches apart. They are left at this distance until stoning is complete. Never leave fruits in pairs.

Morello Cherries are disbudded in a similar manner to that recommended for Peaches, but the treatment for wall-grown Sweet Cherries and Plums is different. In such cases all lateral growths are pinched back to two or three leaves, except where a lateral growth can be trained to fill a vacant space on the wall. Any secondary growths are pinched out while small. This treatment builds up fruiting spurs for next year and reduces winter pruning to a minimum. Keep all wall trees well supplied with water as a shortage of moisture at the roots will cause the young fruits to drop. Should *aphis* be present, control by spraying with a nicotine wash.

Where Gooseberry bushes are carrying heavy crops lighten the load by removing the berries low down on the branches and any others which are badly placed. Such berries may be used for stewing or preserving.

In the Apple orchard keep a look-out for Apple sawfly; pick off and burn any fruits attacked by this pest. Control isolated outbreaks of woolly *aphis* by painting the colonies with methylated spirit.

In the early Peach house remove any foliage shading the fruits, and as soon as the fruits commence to colour cease watering and feeding. Thin the fruits in the late Peach houses as soon as stoning is complete, and continue to syringe the foliage in the morning and evening. In the early vinery maintain a cool, airy atmosphere, but give a little pipe heat at night to prevent moisture condensing on the berries. As the Muscats begin to colour provide a little more air, and in the late vinery continue to thin the bunches.

FEATURES OF MY GARDEN.—III.

AUTUMN COLOUR AT ABBOTSWOOD.

By MARK FENWICK, V.M.H.

Now that all the coloured leaves have been blown off the trees and shrubs in the garden it may be interesting to make a few notes of those which made a good display last year. It may be asked why last year should have been favourable for autumn leaf colouring, but this is a physiological problem I do not pretend to understand; I am told it was owing to ample sunlight, sufficient moisture at the root and absence of cutting winds.

As a rule *Prunus Sargentii* and *Berberis Thunbergii* are the first shrubs to colour here, and these very seldom fail. Last year they were, I think, more brilliant than usual. The *Berberis* planted over a bank of *Erica carnea* in the Heather Garden over thirty years ago always looks well, but when we planted another group, not ten yards away, they refused to colour, so had to be thrown out. This has happened in other parts of the garden too, so it must not be supposed that this common old *Berberis* will always colour in any position or soil. We often have to move shrubs two, three or more times before finding a congenial spot where they will colour.

Euonymus alatus is sometimes most difficult to accommodate; so is *Ribes americanum*; but at last we found a place where the latter turned a very pretty shade of pink, so we tried to increase it by planting another group only three or four feet away, but they refused to play up and had soon to be destroyed.

Acer rubrum is always very good here and in my opinion is one of the finest of all autumn colourers; if the Japanese Maples are eliminated it can hold its own or surpass any other *Acer*, although the following are all good here: *A. Ginnala*, *A. laetum*, *A. saccharum*, *A. koriana*, *A. rufinerve*, *A. nikoense*, *A. capillipes* and *A. griseum*.

Acer rubrum begins to colour as a rule in the beginning of October, but different specimens will continue to colour until the beginning of November. One tree planted over thirty years ago next to a *Cupressus macrocarpa* and a *Populus canadensis aureus* is always a striking object. There is, however nothing here to beat *Cercidiphyllum japonicum*, which generally colours in early October; however, last year one tree beat all records by assuming the most lovely colours at the end of August and retaining its leaves for five or six weeks. One never knows when *Cercidiphyllums* are going to turn or what colour they will assume. Here they are seldom all red or all yellow, but generally assumes shades of red, orange, pale yellow, pale pink, mauve and green. About thirty or more years ago I planted a group of young plants raised from seed collected in Japan by the late Lord KESTEVEN. These were planted

beside a small stream, where they coloured brilliantly every year until they were about 25 feet tall, when they began to go back ; but as they started throwing up very finely coloured leaves from the base, we cut one or two to the ground. This proved a great success, as the leaves they threw up from the base were as fine as they were when quite young. We therefore cut them all to the ground, and were rewarded last year by a clump of most gorgeously coloured bushes about 6 feet high which were at their best about mid-October ; but other specimens coloured at different times in September and October, one actually retaining its leaves until about November 8, so that we had Cercidiphyllums from the end of August until early November—over two months. There is no doubt they like a damp spot—here water runs over their roots—and if they are planted away from water their leaves are small and of poor colour.

Disanthus cercidifolius and *Rhus Potaninii*, which are so fine in some gardens, have never done well here, so we are treating them like the Cercidiphyllums and have cut them to the ground. with most promising results. Anyone who has visited Westonbirt about the third week in October will remember the lovely rose-pink colour of this Rhus. The late Sir G. HOLFORD used to consider October 18 to 24 about the best time for autumn colour, and it is also about the best time here.

The Japanese Maples are then at their best, and I certainly never remember them so good as they were last year ; but we have not the shelter and background nor the fine specimens they have at Westonbirt, so can never aspire to their standard of beauty.

The following are some of the best we grow here :

Acer japonicum, *A. j.* var. *laciniatum*, *A. j.* var. *vitifolium*, *A. palmatum atropurpureum*, *A. p.* var. *dissectum*, *A. p.* var. *palmatifidum divisum*, *A. p.* var. *septemlobum*, *A. p.* vars. *septemlobum elegans*, *s. purpureum*, and *s. Osakazuka*.

We also have some apricot and pale yellow forms from Westonbirt.

The following shrubs colour early, i.e. before October 18, and are all good :

Euonymus Bungeanus, *E. pauciflorus*, very pretty in September. *Euonymus oxyphyllus*, *E. yedoensis*, crimson. These Spindles are all from Korea, Manchuria and Japan and are very pretty in September and comparatively new. *Euonymus europaeus* var. *atropurpureus* is a fine form which came to me many years ago from SMITH of Newry, and which turns almost scarlet in autumn and retains its leaves until well into November.

Sorbus commixta, *S. rufo-ferruginea*, *S. Matsumurana*, from Japan, and *S. discolor* from North China : this last will not colour on its own roots here and must be grafted on the thorn. It is the best of all the Sorbus here. *Sorbus Sargentiana* is said to be very good in some gardens, but it is of no account here. Perhaps it would colour better if grafted on the thorn like *S. discolor*. *Pyrus arbutifolia* (which we are now told to call *Aronia*) never fails, and *P. a.* var. *erecta* is a very fine form introduced by MARCHANT of Wimborne.

Nyssa sylvatica, the Tupelo tree from Eastern North America, is the most brilliant tree in the garden in mid-October but rather fleeting. *Acer saccharum*, the Sugar Maple, is very beautiful, and *A. dasycarpum*, the Silver Maple, never fails to colour. *A. lactum* turns bright yellow.

Rhus Toxicodendron, the Poison Ivy, has gorgeous tints of red and yellow; *R. typhina laciniata* is brilliant but fleeting; while *R. Cotinus* is variable but very fine at its best; *R. cotinoides* is also variable, but there is nothing to beat it when at its best.

Aesculus turbinata and *Cladrastis tinctoria* both turn a fine yellow. *Fothergilla major* also turns yellow, but is a very inferior though less common plant than *Fothergilla monticola*, one of the most brilliant of all autumn-colouring shrubs. Last year, however, it was very late and less good than usual, which we attributed to the fact that it bloomed so profusely in the spring. This we thought might have caused the leaves to be small and less brilliant than they usually are.

Quercus coccinea, *Knaphill* var., was very good and held its leaves to mid-November. One specimen of *Liquidambar styraciflua* in the autumn garden coloured before mid-October and was very fine, but the others were, as usual, very late and not particularly good.

Cornus Kousa was very fine last year, and *C. Baileyi* with red bark and red leaves seems to be rather uncommon in gardens, although well worth growing. *Gaylussacia dumosa* is only about 2 feet high and brilliant scarlet.

Berberis pallens should be in every garden. It colours soon after *B. Thunbergii* and is as good as or better than this species.

Prunus pumila, the dwarf American Cherry, is a very pretty glaucous pink and uncommon in gardens.

Crataegus prunifolia and *C. Crus-Galli*: of the large family of Thorns these two are probably the best for autumn foliage; both are yellow tinged with red, though the first named according to BEAN should be a rich glowing crimson. Many of the Thorns are also worth growing for their fruits.

These about conclude the early colourers, and before passing on to the later ones I think I ought to mention the flowers which help to beautify the autumn garden. First and foremost, of course, *Gentiana sino-ornata* and var. *praecox* take pride of place and are planted in hundreds under the Enkianthus, the Vacciniums, Stewartias and Azaleas, and bloom from mid-September to mid-November.

The white *Colchicum speciosum*, *Schizostylis*, *Crocus speciosus*, *Cyclamen neopolitanum*, *Nerine Bowdeni*, and the best of all Pampas Grasses, 'Sunningdale Silver,' are all good and could be added to almost *ad infinitum*.

The following shrubs colour after mid-October:

Photinia villosa, *Oxydendrum arboreum*, *Enkianthus perulatus* var. *japonicus*, and *Vaccinium virgatum* all change to shades of scarlet and require lime-free soil. *Acer nikoense*, *Clethra alnifolia*, *Hamamelis mollis* and *Carya porcina* are yellow.

Parrotia persica generally turns red and yellow, but last year one

turned a lovely pale yellow tinged with pink, and if it would always do this it might rank as the most beautiful of all autumn colourers.

Enkianthus campanulatus turns scarlet and yellow.

Vitis Coignetiae is very beautiful scrambling over an old Holly; *V. purpurea* is very fine and reliable, while *V. flexuosa* is poor but might colour if planted out in a pot and starved. *Taxodium distichum*, the deciduous Cypress, turns copper colour. *Caragana Gerardiana* has violet leaves and fruit. *Prunus subhirtella* turns to yellow, tinged with pink. *Acer griseum* is a lovely shrimp-pink, not at its best until the end of October. Some leaves of *Quercus palustris* turn scarlet, others remain green, and it is very pretty. *Q. marilandica* turns crimson.

The following do not colour until November :

Cotoneaster horizontalis—both leaves and fruit are scarlet. It is perhaps the best shrub in the garden at the beginning of November; *Berberis Sieboldii* does not fruit freely but colours very brilliantly. *Eucryphia glutinosa* blooms in August. Its leaves turn scarlet and yellow. *Vaccinium pensylvanicum* retains its scarlet leaves until December.

Spiraea japonica atrosanguinea is a new-comer here and most attractive in shades of red, yellow and crimson, while *S. j. var. glabrata* is also quite pretty. *Cornus Kousa chinensis* was too late last year to colour well, and *Viburnum prunifolium* was also a failure; it should colour in mid-October. *Euonymus alatus* and *Fothergilla monticola* were both very late last year; the double Japanese Cherries were rather poor, but *Malus coronaria* turned to a beautiful crimson.

Photinia Beauverdiana is bright scarlet but was too late last year to show of its best, and *Rosa nitida*, from North America, was 2 feet high with bright red leaves and stems. *Xanthorrhiza apiifolia*, from east United States, bears pretty pinnate leaves which turn bright yellow in late autumn.

November is *par excellence* the month for Barberries. Last year they fruited wonderfully, and as usual *Berberis Prattii* and *B. Staphiana* were much the best here.

B. dictyophylla, *B. yunnanense*, *B. brevipaniculata*, *B. aristata*, *B. Francisci-Ferdinandii*, *B. rubrostilla*, and others are all good, but we have raised large numbers of seedlings which are as good as or better than any of the above. We even discarded *B. Wilsonae* last year, as we find so many of our seedlings are better. We also find that those plants which fruit freely do not colour, and that those which colour do not fruit.

All the Cotoneasters have fruited well, so have most of the Rose species, *Symporicarpus laevigatus*, *Pernettya mucronata*, *Gaultheria cuneata*, and the Common Holly, and last of all remain the Dogwoods and Willows, of which *Salix alba*, *S. britzensis* and *S. vitellina* are beautiful if cut to the ground in the spring.

Rubus biflorus, the white-washed Bramble, makes a good contrast to the above.

UNIVERSITY BOTANIC GARDEN, CAMBRIDGE.

By F. G. PRESTON, V.M.H.

THE Cambridge University Botanic Garden can take a place among the leading Botanic Gardens of the world, although it is apparently young in comparison with many. In speaking of its history and origin, we are justified in going back to the first Botanic Garden which was started in 1761, or even further back, to show that for nearly two hundred years before that date the study of plants was being carried on, but did not receive a great deal of encouragement, although unsuccessful attempts had been made by various individuals, periodically, to obtain a garden. Even when a garden was, at last, started it received very little support from the authorities ; and in its early days at several times almost dropped out of existence. The first record we have of any steps being taken to obtain a Physic Garden was in 1588, when JOHN GERARD, sometimes spoken of as the Father of English Gardening (perhaps better known as the author of Gerard's Herbal, one of the greatest botanical works of the sixteenth century), offered his services.

There is preserved in the Lansdowne manuscripts a draft of a letter in GERARD's handwriting, speaking very highly of his great practice, experience as a Herbalist, also his travels into foreign lands, and suggestions for the construction of a botanic garden as a step towards organized study. "And that your Universitie be not inferior herein to any Universitie in Europe, or any other part of ye world." The letter is endorsed "John Gerard, a bill of his own drawings for ye L. Ther. (Burleigh) to signe to ye Universitie of Cambridge, for planting of gardens."

This proposal to lay out a botanic garden was made to Lord BURLEIGH, who was at that time Chancellor of the University of Cambridge, but it is doubtful if the suggestion was ever conveyed to that body ; anyway, nothing came of it, and the schemes remained on paper only. Before this the only reference to anyone interested in botany or the study of plants was to WILLIAM TURNER (known as the Father of English Botany), up at Pembroke Hall (now Pembroke College), studying medicine, and who found little assistance to help him in his favourite studies—"Materia medica," and botany of the time. He said he "could learn never one Greke neither Latin nor English name of any herb or tree" and the only book available to him was the Grete Herbal,* and this he said was full of unlearned cacographies and false names.

The scheme for a Physic Garden was again revived in 1695-96,

* Published 1516, printed by one PETER TREVERIS, but the name of the author seems to have been lost.

and it is recorded that plans were drawn up and measurements taken by a Dr. ECHARD with the assistance of LOUDON, who was gardener to WILLIAM III. Also from an entry in the Vice-Chancellor's accounts "Spent in London about October 20 about the Physic garden £2-0-0; Laid out towards the Physic garden as appears in the book £48-2-7d." £11 of this amount was spent in obtaining the advice and assistance of Loudon, who visited Cambridge on this business three times during 1696. No record is kept of the site, although one must have been actually measured, for it is recorded in the University accounts for 1696-97, with a note that the expense was incurred in the previous year and that the sum of £11 was paid to one, ROBERT GRUMBOLD, "for measuring the intended Physic Garden." However, the scheme was abandoned, matters remained as they were, and Cambridge was still without a Physic Garden.

Previous to this, the study of botany at Cambridge had been carried on by the celebrated naturalist JOHN RAY, who came up to Catharine Hall (now St. Catharine's College) in 1644, and after two years migrated to Trinity College.

Although one may say this is not necessarily connected directly with any Botanic Garden here, his work for botany at the time justifies some remarks about him. He was a keen student of Nature, and although he received no assistance from either his College or the University he soon began to build up a reputation as a botanist, during the study of which he took botanical walks and excursions around Cambridge, with the result that he laid before the botanical world in 1660 a little volume entitled *Catalogus Plantarum circu Cantabrigiam nascentium*, which was the first flora of Cambridgeshire published, and incidentally the pioneer of local floras. Ten years later he published his catalogue of English Plants under the title of *Catalogus Plantarum Angliae et insularum adjacentium tum indigenas tum in agris passim cultas complectens*. This consists of all plants that he had found at any time growing wild in England during his many excursions. A second edition was published in 1677, and a supplement in 1688 which in itself was a considerable accession to English botany. RAY wrote many other books and botanical writings, and also devised a scheme of classification of plants, which, with all its defects, was the best effort of the seventeenth century.

During his teaching at Cambridge, RAY made many botanical tours over England. During his last, which was to the north, he was suffering from an attack of jaundice, and in a letter to his friend Dr. LISTER, he said he recovered from the attack "by sticking to one medicine for four or five days, that was an infusion of stone-horse dung with saffron in ale." This remedy is worth quoting as it gives some idea of the state of medical art of that time, although perhaps from a medical point of view it may not be so crude as it sounds.

RAY did much for the advancement of botany during his studies at Cambridge, and stands out amongst his contemporaries as one of the most distinguished men of science of his time. Not only was he

conspicuous as a naturalist, but he was one of the best type of the old Puritan scholar. He died in 1705.

DENHAM, his biographer, says of him, "In his dealings, no man more humble, courteous, and affable; towards God, no man more devote; and towards the poor and distressed, no man more compassionate and charitable, according to his abilities."

In 1724 the University was induced to establish a Professorship of Botany and a certain RICHARD BRADLEY obtained the appointment, it is said in clandestine and fraudulent manner, by means of pretended verbal recommendation from Dr. SHERARD of Oxford to Dr. BENTLEY, Master of Trinity College, Cambridge, at that time. He also made pompous guarantees that he would procure for the University a public Botanic Garden by his own private purse and personal interest.

BRADLEY had achieved some reputation as an experimental worker as well as author of several works. In the strictly scientific sense it perhaps would be better to regard him as an authority on gardening and agriculture rather than on botany. Little was known of his career before 1716, when he published a work on Succulent Plants which excited considerable attention, and was probably the first book published on that subject.

His career, however, was a failure; he not only failed to carry out the garden scheme, but took little or no active part in botanical teaching. A movement was on foot to turn him out of his Professorship, but although JOHN MARTYN was appointed to give lectures, BRADLEY was allowed to retain the title of Professor during his life. BRADLEY died in 1732, and JOHN MARTYN, a London man, was made Professor of Botany.

In 1731 things looked more hopeful and many conferences were held between the Vice-Chancellor, Dr. MAWSON, then Master of St. Bennet's College (now Corpus Christi); Dr. SAVAGE, Master of Emmanuel College; and JOHN MARTYN. A Mr. BROWNELL of Willingham, a small village a few miles from Cambridge, suggested the idea of making a Physic Garden on his estate. He was a wealthy man and an ardent lover of botany. The ground was selected, and Mr. PHILIP MILLER, the famous Chelsea gardener, was called in to advise about the plan and construction of the garden, but lack of general interest of the University in the subject hindered progress. The matter fell through and Mr. BROWNELL's estate was diverted into another channel.

After MARTYN's appointment to the Professorship he still continued to live in Chelsea, only coming to Cambridge to deliver his lectures, and these he discontinued in 1734, as there was no botanic garden and he met with no support: so, to use the words of Sir J. E. SMITH, first President of the Linnean Society of London, "Botany slept from 1734 till 1761, when WALKER raised it from a deep slumber. The Professor had neither salary nor students."

During this time MARTYN practised medicine in Chelsea and had done so for more than twenty years, resigning his Professorship in 1761; he presented to the University his herbarium and collection of

botanical specimens, drawings, etc. He was succeeded by his son THOMAS MARTYN. JOHN MARTYN did good work, and during his early years in London he worked on the floras of Middlesex, Surrey, Kent, and Essex, going farther afield later. He was the author of many botanical writings, his greatest being *Historia Plantarum Rariorum*. He lived to see the long-desired object attained, the establishment of a Botanic Garden at Cambridge. MARTYN died at Chelsea in 1768. The genus *Martynia* perpetuates his name.

The years 1759-62 saw the establishment of a Botanic Garden and its presentation to the University through the liberality of Dr. WALKER, who was at that time Vice-Master of Trinity College. On the advice of his friend, PHILIP MILLER, of Chelsea, a piece of ground was purchased for the sum of £1,600, on the site of the Monastery of the Austin Friars in the parish of St. Edward's. This, with some adjoining property, which already belonged to Dr. WALKER, amounted to over five acres in all, well walled in, quite open to the south, and conveniently sheltered by the town, with an ancient water course through the midst of it. This ground was made over to the University by an Indenture dated 24th day of August 1762, which is in the Registry's office.

Thus started the first Botanic Garden in Cambridge, and although much of what I have so far written may not be directly connected with the Cambridge Botanic Garden, it indicates that botany in some form had been dealt with in Cambridge, but, more than that, it shows that difficult as a Botanic Garden may be, at times, to maintain, there are occasions when it is still more difficult to start.

The garden was laid out and greenhouses and other buildings erected, including a lecture room for the Professor of Botany, part of the cost of which was defrayed by public subscription. Dr. THOMAS MARTYN was appointed Walker Reader in Botany, and the first Curator was CHARLES MILLER, son of PHILIP MILLER of Chelsea.

With the advent of the garden, botany for a time was taking an active part in University life. The influence of RAY and his system, which was considered the best at the time, was gradually being superseded in a number of botanical establishments, including Cambridge, by the development of the system of LINNAEUS. Thus THOMAS MARTYN was the first public advocate and the earliest promulgator of the Linnean System in an English University.

The garden, although founded, possessed equipment of the most meagre order, and upon the Professor fell the larger share of its organization and development. Although he was assisted in his duties for seven years by CHARLES MILLER as Curator, the garden was a source of considerable anxiety. MILLER left in 1770 and went to the East Indies, and owing to difficulty in finding a capable successor MARTYN, with no remuneration, took upon himself the duties of Curator, which he carried out for some years.

In course of time other Curators followed, but no record seems to be available of the definite periods of service.

The Professor having carried on the post for some time, a Mr. CLARKE was appointed who was quickly succeeded by PHILIP SALTON, who must have held the post for quite a short time. He was followed by JAMES DON, author of *Hortus Cantabrigiensis*, a catalogue of plants cultivated in the garden, which ran into ten editions, the last three appearing after his decease.

He was succeeded by ARTHUR BIGGS, who held the post for several years, practically until the end of the existence of the old Botanic Garden.

Professor T. MARTYN left Cambridge in 1776, and for the next twenty-four years returned annually, with three exceptions, to give lectures ; he was still University and Regius Professor in Botany, Walker Reader in Botany, and part of that time also Curator of the garden. The Regius Professorship of Botany was established in 1793 through the influence of the EARL OF CLARENDON.

Most of MARTYN's time was spent in botanical writings, which included a new edition of Miller's Gardener's Dictionary. This was as complete a book of reference as was possible, and practically a new work arranged in the main upon LINNAEUS' system, but MARTYN modestly allowed it to pass under MILLER's name. It appeared in four folio volumes in 1807, and occupied MARTYN twenty-two years, for which he was paid £1,000. MARTYN died in 1825 in his ninetieth year.

JOHN STEVEN HENSLOW followed MARTYN as Regius Professor and Walker Lecturer ; the University Professorship was kept in abeyance. The Botanic Garden, which had been established with so much difficulty, had fallen into a very bad state, and its Governors seemed to be perfectly contented that it should remain so. HENSLOW often reported its neglected condition, "utterly unsuited to the demands of modern science." It was in the heart of the town, on bad soil and there was no possibility of enlarging it. Erection of buildings in the neighbourhood had made the site ill suited as a garden, and the space was found to be too limited for the number of species introduced into the country at that time. But it was several years before he could overcome the indifference of the authorities and get any improvement.

However, in 1831 an opportunity occurred and the University was enabled to purchase a piece of ground about forty acres in extent situated about three-quarters of a mile out of the town along the London Road, now known as Trumpington Road. For this purpose a Bill was passed in Parliament in March, 1831, for sanctioning an exchange of lands between the University and Trinity Hall, for the removal of the site of the Botanic Garden to the spot obtained (at that time cornfields, close to which some years later the Railway Station was built), and where the present Botanic Garden stands. Years, however, elapsed before it was in a condition to receive plants, and this was a great disappointment to the Professor.

With a view to the laying out of the new garden, HENSLOW had studied the arrangements at Kew, at that time under the directorship

of Sir W. J. HOOKER. He also had availed himself of the advice of LINDLEY, who was then Professor of Botany at the University College, London, and who had been connected with the Horticultural Society's (now the R.H.S.) garden at Chiswick, with the intention of making the Cambridge garden a rival to those of Edinburgh, Dublin, and Glasgow. He was also assisted in the actual laying out of the garden by other Cambridge people, including CHARLES CARDALE BABINGTON, who was then at St. John's College and who ultimately succeeded him in the Professorship.

A Mr. MURRAY was secured as Curator in 1845. He was a very capable man and of great assistance in determining the arrangement of the garden, but unfortunately he died in 1850 almost before things were established.

Laboratories now stand on the site of the old Botanic Garden, and no evidence is now left to show that the ground had been used as such ; although up to a few years ago a very magnificent specimen of *Sophora japonica* was still standing, recorded as one of the two largest specimens in the country. For years the existence of the tree was in jeopardy. To some it was a wonderful specimen and they tried to preserve it. To others it was just a tree, darkening the rooms near by, and, therefore, what good was it ? Anyway, in 1933 it unavoidably had to be cut down to make room for a new Zoological Laboratory. Such is the way of progress !

Although the site of the present garden was taken over in 1831, it was not until 1846 that the garden was officially opened. This was performed by the Rev. R. TATHAM, D.D., Master of St. John's College, then Vice-Chancellor, when the Lime tree standing by the main gates was planted to celebrate the event. The gates just mentioned are very fine and were from the Old Garden, standing at the entrance in Pembroke Street, but were not erected in their present position until 1909.

The garden was being gradually developed ; approximately 18 acres were let out in allotments with a view to taking over the ground for botanical work in the future. The remainder had been laid out, greenhouses and other buildings were erected, a pond for growing aquatic and bog plants was formed from two large gravel pits which had been opened to obtain gravel for building the Houses, making roads and paths.

The collections of large trees are botanically arranged chiefly as a belt round the outside. Many of these have now developed into good specimens, some unequalled in the country.* Fig. 47 illustrates *Rosa moschata* growing happily among the branches of an Austrian Pine and the specimen of *Pinus Gerardiana* seen in Fig. 48 is reputed to be the largest in the country. The collections of smaller trees and shrubs are in the centre of the garden. Family groups of herbaceous plants were arranged in the island style and it is still one of the few Botanic Gardens to retain this plan. This style is more ornamental

* See Trees of Cambridge Botanic Garden, JOURNAL of the Royal Horticultural Society, vol. 41, August, 1915.

EXTRACTS FROM THE PROCEEDINGS
OF THE
ROYAL HORTICULTURAL SOCIETY.

GENERAL MEETINGS.

APRIL 16, 1940.

The Peter Barr Memorial Cup.

To Mr. W. Slinger of the Slieve Donard Nursery Co., Newcastle, Co. Down.

The Engleheart Challenge Cup, for twelve varieties of Daffodils raised by the Exhibitor.

To Mr. J. L. Richardson, Waterford.

The Gold P. D. Williams Medal, for twelve varieties of Daffodils, Division II
To Major C. B. Habershon, Aston-on-Clun.

The Banksian Medal for the best bloom shown in the Competitive Classes for Daffodils.

To Mr. J. I. Richardson, for a bloom of *Narcissus 'Green Island.'*

The second Masters Memorial Lecture was given by Professor F. E. WEISS,
D.Sc., LL.D., F.R.S., F.L.S., his subject being "Graft Hybrids and Chimaeras"
Chairman, Sir ARTHUR HILL, K.C.B., LL.D., D.Sc., F.R.S., V.M.H.

FLORAL COMMITTEE A.—Mr. W. R. OLDHAM, V.M.H., in the Chair, and sixteen other members present

Awards Recommended :—

Silver Flora Medal.

To Messrs. Allwood Bros., Haywards Heath, for an exhibit of Carnations.

Silver Banksian Medal.

To R. F. W. Cartwright, Esq. (gr. Mr. E. Humphris), Aynho Park, Banbury, for an exhibit of Hippeastrums

To Messrs. C. Engelmann, Ltd., Saffron Walden, for an exhibit of Carnations and Pansies.

Flora Medal.

To Mr. J. Douglas, Great Bookham, for an exhibit of Auriculas.

Banksian Medal.

To Messrs. Blackmore & Langdon, Bath, for an exhibit of Polyanthus, Schizanthus and Delphiniums.

To The Stuart Low Co., Enfield, for an exhibit of Carnations.

To Messrs. C. Wall & Sons, Ltd., Bath, for an exhibit of Aquilegias and *Primula obconica*.

Award of Merit.

To Pelargonium 'Carmine' as a greenhouse flowering plant (votes 16 for, 0 against), shown by R. F. W. Cartwright, Esq. See p. 191.

Cultural Commendation.

To Mr. E. Humphris, gardener to R. F. W. Cartwright, Esq., for exceptionally well-grown plants of Pelargonium 'Carmine.'

Selected for trial at Wisley.

Primula 'Purple Wanda,' shown by Mr. J. T. West, Brentwood.

Other Exhibits.

Hippeastrums 'Elizabeth Cartwright' and 'John.' Shown by R. F. W. Cartwright, Esq.

FLORAL COMMITTEE B.—Lord ABERCONWAY, C.B.E., V.M.H., in the Chair, and fifteen other members present.

Awards Recommended :—

Silver-gilt Banksian Medal.

To Messrs. J. Cheal & Sons, Ltd., Crawley, for an exhibit of flowering trees and shrubs.

Silver Flora Medal.

To Messrs. C. Elliott, Ltd., Stevenage, for an exhibit of Primulas and Saxifrages.

To Messrs. R. Gill & Son, Penryn, Cornwall, for an exhibit of Rhododendrons and Anemones.

To Mr. W. J. Marchant, Wimborne, for an exhibit of flowering shrubs and Shortias.

To Messrs. L. R. Russell, Ltd., Windlesham, Surrey, for an exhibit of flowering trees.

Silver Banksian Medal.

To Messrs. Hillier & Sons, Winchester, for an exhibit of flowering trees and shrubs.

To Knap Hill Nursery, Ltd., Woking, for an exhibit of flowering trees and shrubs.

Flora Medal.

To Messrs. W. E. Th. Ingwersen, Ltd., East Grinstead, for an exhibit of rock garden plants.

To Mr. E. Ladham, Elstead, Surrey, for an exhibit of a rock garden.

To The Stuart Low Co., Enfield, for an exhibit of Camellias and other shrubs.

To Messrs. M. Prichard & Son, Ltd., Christchurch, for an exhibit of rock garden plants.

To Messrs. G. Reuthe, Ltd., Keston, Kent, for an exhibit of flowering shrubs.

Banksian Medal.

To Mr. A. Corderoy, Eltham, Kent, for an exhibit of rock garden plants.

To Mr. K. W. Harle, Lower Basildon, Berks, for an exhibit of succulents.

To Messrs. Toogood & Sons, Ltd., Southampton, for an exhibit of rock garden plants.

Other Exhibits.

Flowering shrubs, shown by Messrs. Burkwood & Skipwith, Ltd., Kingston-on-Thames.

Rock garden plants, shown by Messrs. J. Cheal & Sons, Ltd.

Tritonia crocata var., shown by Messrs. W. A. Constable, Ltd., Southborough, Kent.

Primula limnoica, shown by Capt. A. Desborough, Broadstone, Dorset.

Prunus x Hillieri, shown by Messrs. Hillier & Sons.

Rock garden plants, shown by Mrs. K. Hopkinson, Coulsdon, Surrey.

Amelanchier x grandiflora var. *rubescens*, *Camellia reticulata*, *Menziesia ciliicalyx*, *Prunus tomentosa* var. *endotricha rosea*, shown by Mr. W. J. Marchant.

Rock garden plants, shown by Marsden Nursery, Ashtead.

Orchis obiensis, shown by Lt.-Col. L. C. R. Messel, O.B.E., Handcross, Sussex.

Flowering shrubs, shown by Messrs. D. Stewart & Son, Ferndown, Dorset.

Prunus 'Pandora', shown by Messrs. J. Waterer, Sons & Crisp, Ltd., Bagshot.

ORCHID COMMITTEE.—Sir JEREMIAH COLMAN, Bart., in the Chair, and ten other members present.

Awards Recommended :—

Silver Banksian Medal.

To Messrs. Charlesworth & Co., Haywards Heath, for a group of Orchids.

To Messrs. Sanders, St. Albans, for a group of Orchids.

To The Stuart Low Co., Jarvis Brook, for a group of Orchids.

Award of Merit.

To *Laeliocattleya* x 'Orange Beauty' (*Lc.* 'Orange Blossom' x *Lc.* 'Orange Gem'), (votes 9 for, 0 against). Shown by Messrs. H. G. Alexander, Ltd., Tetbury, Glos. See p. 189.

To *Aerides Vandarum* var. 'Delicate' (votes 7 for, 3 against), Shown by Messrs. Sanders See p. 188.

NARCISSUS AND TULIP COMMITTEE.—Mr. E. A. BOWLES, F.L.S., F.R.E.S., V.M.H., in the Chair, and twenty-four other members present.

Awards Recommended :—

Gold Medal.

To Mr. J. L. Richardson, Prospect House, Waterford (votes 16 for, 4 against).

Silver-gilt Flora Medal.

To Messrs. Barr & Sons, 13 King Street, Covent Garden, W.C. 2.

To The Berrow Bulb Farm, Ltd., Burnham-on-Sea.

To Mr. Guy L. Wilson, Broughshane, co. Antrim.



FIG. 46. CAMBRIDGE BOTANIC GARDEN. FROM A PRINT OF 1815
(See p. 171.)

[*To face p. xlvi.*



FIG. 47.—CAMBRIDGE BOTANIC GARDEN: *ROSA MOSCHATA* GROWING OVER
AN AUSTRIAN PINE.

(See p. 176.)

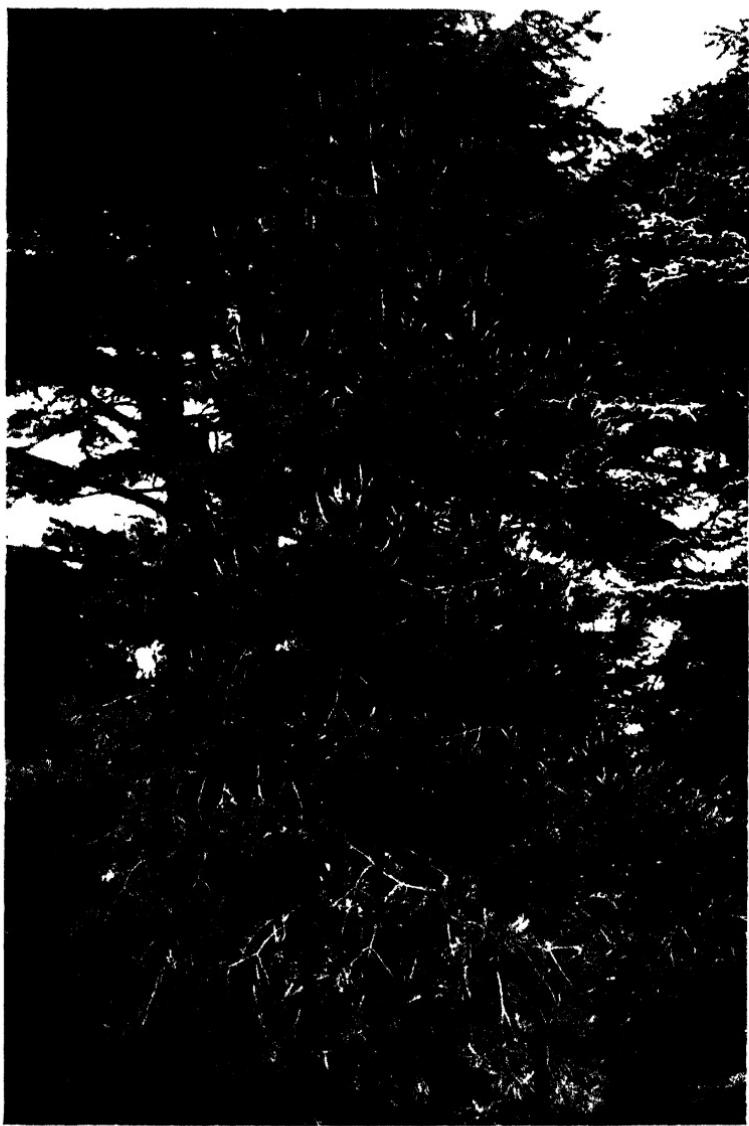


FIG. 48 CAMBRIDGE BOTANIC GARDEN . *PINUS GERARDIANA*
(See p. 176)



Photo, R. M. Adam.]

FIG. 49.—*PRIMULA SONCHIFOLIA* IN L.T.-COLONEL J. L. WOOD'S GARDEN.
(See p. 181.)



Photo, R. M. Adam.]

FIG. 50.—*PRIMULA SONCHIFOLIA* IN LT.-COLONEL J. L. WOOD'S GARDEN.
(See p. 181.)



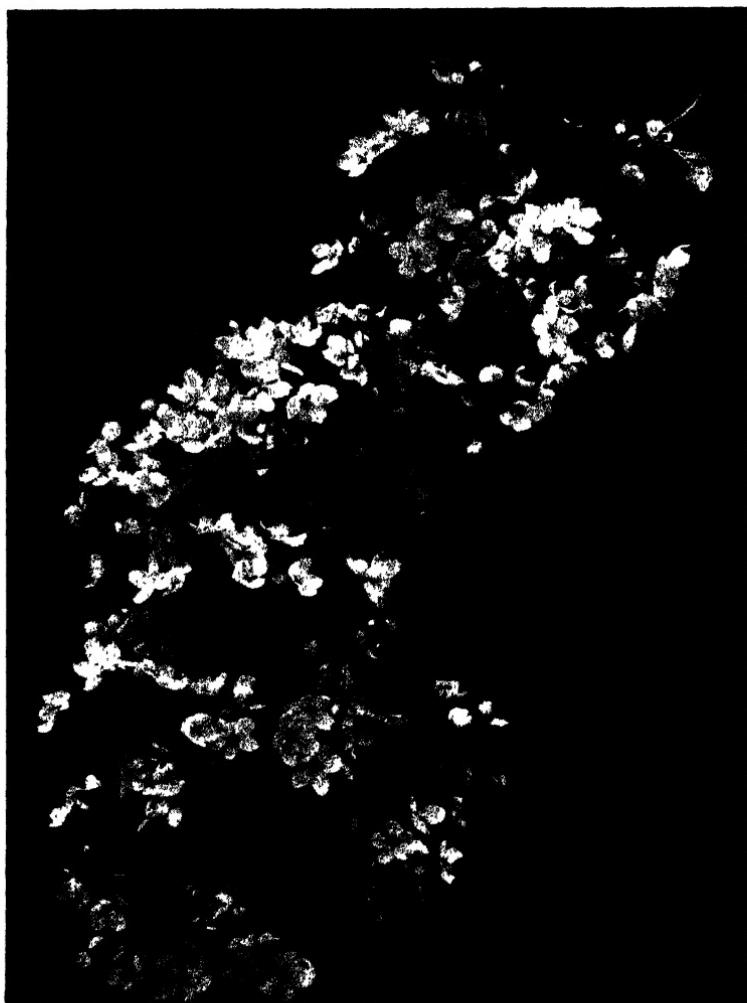
Photo, N. K. Grant

FIG. 51. *LINUM RUBELLUM* AT WISLEY
(See p. 163.)



Photo N. K. Gould

FIG. 52 (HRYSANTHEMUM RUBELLUM
(See p. 187.)



Photo, N. K. Gould.]

FIG. 53—*MALUS HUPEHENSIS*.
(See p. 188.)

[To face p. xlix.

Silver-gilt Banksian Medal.

To the Slieve Donard Nursery Co., Newcastle, co. Down.

To the Trenoweth Valley Flower Farm, Ltd., St. Keverne, Cornwall.

Silver Banksian Medal.

To Messrs. D. Stewart & Son, Ferndown Nurseries, Wimborne.

Flora Medal.

To Mr. R. F. Calvert, Coverack, Cornwall.

To Messrs. H. Prins, Ltd., Wisbech.

Banksian Medal.

To Messrs. Kelway & Son, Langport.

To Messrs. Wakeley Bros., Ltd., Bankside, S.E. 1.

First-class Certificate.

To *Narcissus 'Ludlow'* as a variety for exhibition (votes unanimous). Shown by Mr. J. L. Richardson. This variety received a P.C. on April 13, 1939

Award of Merit.

To *Narcissus 'Dervish'* as a variety for exhibition (votes unanimous). Shown by Mr. Guy L. Wilson. See p. 190.

To *Narcissus 'Elgin'* as a variety for exhibition (votes unanimous). Shown by Mr. Guy L. Wilson. See p. 190.

To *Narcissus 'Truth'* as a variety for exhibition (votes unanimous). Shown by Mr. Guy L. Wilson. See p. 191.

To *Narcissus 'Kanchenjunga'* (votes unanimous). Shown by Mr. Guy L. Wilson. See p. 190.

To *Narcissus 'Content'* (votes unanimous). Shown by Mr. Guy L. Wilson. See p. 189.

The following awards as early varieties for cutting from the open for market were made after trial at Gulval, the final inspection being made on March 22, 1940

Award of Merit.

To *Narcissus 'Fortune's Bowl'*, sent by Mr. R. F. Calvert. See p. 190.

To *Narcissus 'St. Keyne'*, sent by Mr. M. P. Williams, Lanarth, St Keverne. See p. 190.

To *Narcissus 'Winkfield's Dower'*, sent by Mr. R. F. Calvert. See p. 191.

Preliminary Commendation.

To *Narcissus 'Narvik'* (votes unanimous). Raised and shown by Mr. J. L. Richardson.

To *Narcissus 'Green Island'* (votes unanimous). Raised and shown by Mr. J. L. Richardson.

To *Narcissus 'Killaloe'* (votes unanimous). Raised and shown by Mr. J. L. Richardson.

To *Narcissus 'Mahmoud'* (votes unanimous). Raised and shown by Mr. J. L. Richardson.

Selected for trial at Wisley.

Narcissus 'Marentha.' Shown by Messrs. Culpin Bros., Spalding, was selected for trial at Kirton and Wisley as a variety for garden decoration.

Other Exhibits.

Narcissus 'Calchas' and *N. 'Constantine'*, shown by W. B. Cranfield, Esq., F.L.S., V.M.H., East Lodge, Enfield Chase.

Narcissus 'Blarney', shown by Mr. J. L. Richardson.

Narcissus 'Carnlough' and *N. 'Fairy King'*, shown by Mr. Guy L. Wilson.

A double green form of *N. cyclamineus* with numerous segments and no corona, sent from Wisley, where it appeared and has bloomed for several seasons.

JOINT RHODODENDRON COMMITTEE.—Mr. J. B. STEVENSON, V.M.H., in the Chair, and fourteen other members present.

*Awards Recommended :—**Award of Merit.*

To *Rhododendron mishmiense* (K.W. 8113) (votes unanimous), as a flowering plant for the cool greenhouse. Shown by Lionel de Rothschild, Esq., Exbury, Southampton. See p. 192.

To *Rhododendron* × 'Seagull' var. 'Seamew' (*R. sutchuenense* × *R. Loderi*) (votes 10 for, 0 against), as a hardy flowering plant for the woodland garden. Shown by Sir Giles Loder, Leonardslee, Horsham (gardener: Mr. H. Whitner). See p. 192.

I PROCEEDINGS OF THE ROYAL HORTICULTURAL SOCIETY.

To *Rhododendron* × 'White Glory' var. 'Pink Glory' (*R. irroratum* × *R. Loderi*) (votes unanimous), as a hardy flowering plant for the woodland garden. Shown by Sir Giles Loder. See p. 192.

Other Exhibits.

R. Watsonii, shown by Lt.-Col. L. C. R. Messel, O.B.E., Nymans, Handcross, Sussex.

R. 'Surprise' var. 'J. E. Harris' (*R. Falconeri* × *R. Thomsonii*), shown by Mr. James E. Harris, Black Pill Nurseries, Swansea.

R. × 'Taranto' (*R. Falconeri* × *R. eximium*), shown by Admiral A. Walker-Heneage-Vivian, Clyne Castle, Black Pill, Swansea, Glamorgan.

Rhododendron Albrechtii, shown by Mr. W. J. Marchant, Keeper's Hill Nursery, Stapehill, Wimborne.

R. × 'Thomwilliams' (*R. Thomsonii* × *R. Williamsianum*) ; *R. × 'Cal-thom'* (*R. Thomsonii* × *R. calophytum*) ; *R. × 'Clio'* (*R. detonsum* × *R. Gilian*), shown by E. J. P. Magor, Esq., Lamellen, St. Tudy, Bodmin, Cornwall.

Rhododendron pumilum, shown by T. Hay, Esq., C.V.O., V.M.H., New Lodge, Hyde Park, W. 2.

R. × 'Venapens' (*R. venator* × *R. repens*), shown by Sir John Ramsden, Bart., Bulstrode, Gerrards Cross, Bucks.

R. × 'Exminster, Little Paddocks var.' (*R. Thomsonii* × *R. camplyocarpum*), shown by Lt.-Col. J. N. Horlick, O.B.E., M.C., Little Paddocks, Sunninghill.

R. sutchuenense × *R. Loderi* ; *R. × 'Farola'* (*R. Fargesii* × *R. Loderi*), shown by Sir Giles Loder.

JOINT ROCK-GARDEN PLANT COMMITTEE.—Major F. C. STERN in the Chair, and six other members present.

Awards Recommended :—

Award of Merit.

To *Saxifraga marginata* var. *karadzicensis* as a flowering and foliage plant for the alpine house and rock garden (votes unanimous). Shown by Messrs. W. E. Th. Ingwersen, Ltd., Birch Farm Hardy Plant Nursery, Gravetye, East Grinstead, Sussex. See p. 193.

To *Adonis Davidi* (votes 6 for, 0 against). Shown by T. Hay, Esq., C.V.O., V.M.H., New Lodge, Hyde Park, W. 2. See p. 188.

Cultural Commendation.

To S. G. Fiedler, Esq., Rosehill, Claygate, Surrey, for a pan of *Ramondia Nathaliae*.

Other Exhibits.

Primula Littledalei, shown by Mrs. Gwendolyn Anley, St. George's, Wych Hill Lane, Woking.

Cassiope species, shown by Lionel de Rothschild, Esq., Exbury, Southampton.

Aubretia 'Kelmscott Purple,' *Aubretia 'Kelmscott Beauty,'* shown by Edwin J. Barker, Esq., Kelmscott, London Road, Ipswich.

FRUIT AND VEGETABLE COMMITTEE.—Mr. W. H. DIVERS, V.M.H., in the Chair, and thirteen other members present.

Exhibits.

Apples, 'Claygate Pearmain,' 'D'Arcy Spice' and 'Rushock Pearmain,' shown by Mr. H. Barnett, Westwood House, Tilehurst, Berks.

Apples, 'Birken,' 'Ontario,' and 'Wagener,' shown by R.H.S. Commercial Fruit Trials, Wisley.

than the usual canal-shaped beds now adopted by most gardens, but not so advantageous for teaching. The outdoor collections were arranged more or less according to the Natural System of DE CANDOLLE. Great credit is certainly due to those responsible for the general lay-out of the garden.

MURRAY, as already mentioned, died in 1850, and was succeeded by J. STRATTON who held the curatorship till 1864, when he was succeeded by C. MUDD who held the post of Curator till his death in 1879. MUDD must have been a character. In those days smoking was prohibited in the garden, and if a visitor was unfortunately caught breaking this rule, MUDD would stand smoking his pipe and shouting "Put out that _____ pipe." I have been told of other amusing incidents that would end up with "he would seem none the worse next morning." Also, at that time the Curator was allowed to do some private coaching, and if by chance a batch of flowers that had opened in the last day or so caught the examiner's eye, but were not out soon enough to catch the eye of the coach, it was most likely that something would happen to that batch of flowers the night or so before the Examination. After MUDD's time it was understood that the Curator should not do private coaching.

During the first twenty years of HENSLOW's term of office he brought about great changes in the position of botany in the University, and by it revived the fame of Cambridge as a botanical centre. The Botanic Garden came into its own, and botany in his hands became a living science. He was probably the means of directing the course of the future career of CHARLES DARWIN, recommending him as naturalist in the *Beagle* on its trip round the world from 1831-36. This was the beginning of DARWIN's wonderful investigations. HENSLOW received great assistance from his old pupil and ultimate successor C. C. BABINGTON, who gradually became the leading figure in the botanical world at Cambridge, and later author of various botanical writings including *Manual of the British Flora*, which had no rival as a British Flora until BENTHAM's *Handbook of the British Flora* was published in 1856.

HENSLOW died in 1861, and the post of Regius Professor of Botany ceased. BABINGTON succeeded to the University Professorship of Botany which had been kept in abeyance since the death of THOMAS MARTYN. The emoluments of the post of Regius Professorship were handed over to the University Chair.

The garden continued to flourish, and various additions were made. In 1867 a rock garden was laid out. This was a new departure, and at the time considered the most remarkable rock garden in England. This has been greatly improved in recent years.

During these days the botany lectures were evidently not of a very high standard, and it is said that BABINGTON's lectures were of no value whatever. They are said to have consisted of descriptions of isolated types, chosen altogether at the discretion of the Curator of the Botanic Garden, who sent down the specimens according to the

supplies available, or the Professor would call in and take with him three times a week such specimens as he could collect conveniently for his own class, as these were the only specimens supplied sixty years ago. The lectures were said to be dull and uninteresting and consequently badly attended, although an improvement took place when S. H. VINES, who afterwards became Sherardian Professor of Botany at Oxford, was appointed Lecturer in Botany in 1876.

In 1879 R. IRWIN LYNCH, on the recommendation of the late Sir JOSEPH HOOKER of Kew, was appointed Curator. The garden had then been established about thirty-five years and had been growing slowly and consistently, but the glasshouses were showing signs of wear and tear. At the outset LYNCH rearranged the plant houses, making their contents more generally accessible and useful, getting together a collection of medicinal plants both in the open ground and in the houses. A collection of Bamboos was planted near the pond, and was the first Bamboo garden to be established in this country. This was followed later by the formation of a bog and water garden near the pond, also the first of its kind, which was considerably extended ten years later.

In 1888-91 a new range of glasshouses was built, consisting of a corridor over ninety yards long, into which a succession of separate houses opened. This introduction of the corridor system was a new departure in botanic gardens, being almost unknown elsewhere at the time. It is an excellent place for growing plants, particularly climbers. Other propagation houses, laboratory, etc. were also built, these structural alterations costing nearly £6,000.

In 1895 BABINGTON died, having held the Professorship for thirty-four years, although he had been in a feeble state of health and confined to his house for some years. BABINGTON was a botanist and not a horticulturist, therefore did not show the interest in the garden his predecessor had done and the two departments were being run separately. This may partly have been due to the Botany School and Botanic Garden being some distance apart, while both had grown very considerably; although, of course, they were essentially but one department. He bequeathed to the Herbarium his collection of plants, some 55,000 sheets, including his collection of British plants which made the Cambridge collection of British plants the best in Great Britain.

The new Professor of Botany was H. MARSHALL WARD, a name made more familiar to many by his son Captain F. KINGDON WARD. Professor WARD was regarded as the most capable and energetic occupant of the Chair; in 1903 he induced the Senate of the University to build and equip at a cost of nearly £20,000 a Botany School consisting of Museum, Herbarium, Lecture Rooms, and Laboratories, which are still second to none in Great Britain.

Professor W. MARSHALL WARD died in 1906 and was succeeded by A. C. SEWARD (now Sir ALBERT CHARLES SEWARD) of St. John's College, who was University Lecturer and whose work on Palaeobotany is well known. He held the office for thirty years.

During the last few years of his time at Cambridge LYNCH had been failing in health and acting on medical advice he retired in September 1919, leaving Cambridge exactly forty years after the day he came. Among the many interesting plants he raised were the hybrid Gerberas so popular now as cut flowers. These he obtained by crossing *Gerbera Jamesonii* with other species, so providing a range of colours and shades seldom found in any other class of plants. He went to live at Torquay, but became a confirmed invalid, and died in December 1924.

The facilities for research at the Cambridge Botanic Garden have been extensively used. Much of the early work on plant genetics by the late Mr. W. BATESON was done there, and genetical researches were continued by Miss E. R. SAUNDERS, Professor R. C. PUNNETT, the late Mr. R. P. GREGORY, Dr. C. C. HURST and others. At the present time the Staff and research students of the Botany School use the Garden extensively for some of their investigations.

As a collection of plants it is second only in England to Kew, and perhaps few other gardens in the world play such a big part in education. From 70,000 to 100,000 specimens are supplied annually (in one year 137,000 were supplied) to the various laboratories, that is to say during term, which is roughly half the year. Two men devote the whole of their time, and sometimes others help, in gathering the specimens, which are sent to the laboratories for the many classes held there. The garden supplies specimens for lectures in botany, biology, forestry, agriculture, cytology, biochemistry, genetics, plant pathology, and mycology, as well as other subjects. Large classes visit the garden regularly, while much work is done out of term in the preparation of material for future use, some having to be prepared quite twelve months in advance. Only one who has seen this work done for a twelvemonth round, or, better still, helped to do it for the many classes during the year, can realize its magnitude. Thousands who visit the garden are ignorant of that side of the work which is always going on, and have only looked upon the Cambridge Botanic Garden either as a garden with an interesting collection of plants, or a public place to walk in and see flowers.

Apart from material supplied for the University lectures, some of the schools in the town are supplied for a moderate fee, while Cambridge Local Examinations, the Oxford & Cambridge Examinations, and many others about the country are supplied with botanical specimens which amount to many thousands each year.

During the Great War the Botanic Garden suffered very much owing to shortage of skilled labour, and it would have taken many years to recover if the late Mr. REGINALD CORY, an old Trinity man, had not come to its rescue by providing financial help to assist in pulling the garden round. He continued this help for several years, and he was a great friend in many other ways. He felt he owed the Cambridge Botanic Garden a great debt, as it was in this garden, while up at College, that he found his love for horticulture, which meant so much to him in after life.

In 1920 the Botanic Garden Syndicate resolved to adopt a new scheme for the management of the Garden to bring it more closely in touch with the teaching of Botany, and to appoint a Director, a systematic and economic botanist, to take part in the training of University students. A grace to the effect was submitted to the Senate and passed on March 6, 1920 (see University Reporter, June 30, 1920), HUMPHREY GILBERT-CARTER, who had spent some years in India and previously worked at Cambridge, being appointed to the post of Director. Subsequently the Botanic Garden became an integral part of the University Botany School, Mr. GILBERT-CARTER holding the dual posts of Director of the Garden and Lecturer in Botany.

The greenhouses after over forty years were in a state of decay and badly needed renewing, so a grant was made by the Financial Board for rebuilding some of them. The work was commenced in 1933, and later by the generous gift of £6,000 by Mr. W. J. COURTAULD, the whole range was completed in the following year ; the rebuilding was done in Burma teak.

Before this Mr. JOHN CHARRINGTON of Trinity College presented the Garden with an Alpine House in teak. He had also helped the Garden in other ways. The Cambridge Botanic Garden has had many other friends.

In 1936 Professor A. C. SEWARD retired. He was succeeded as Professor by F. T. BROOKS of Emmanuel College, who had been Lecturer in Botany and later Director of the Sub-department of Mycology in the Department of Botany.

The Garden is open free to the public during the week from 8 A.M. till 8 P.M. in the summer, but shorter hours during the winter ; on Sunday to key holders, who subscribe annually. Anyone can subscribe for a key, but non-members of the University must be recommended by a Member of the Senate.

The average annual rainfall is less than 21 inches and the soil of the Garden of a light sandy nature, calcareous, and in some places very shallow on gravel, so that it soon drains. This has its advantages, for even after quite a wet spell it is possible within a short time to get on the soil to work it. Then again many plants flower and fruit freely at Cambridge that in many places rarely do either ; this is partly due to the light soil not encouraging excess growth. The plants cease their growth earlier in the season, therefore ripening better, and this, combined with the dry cold, is also undoubtedly the reason why a number of plants succeed in the open at Cambridge during the winter, whereas they fail even farther south than London. Cambridge suits plants of dry hot regions. The light soil, low rainfall, and dry atmosphere, are against the success of many plants, particularly Coniferae generally, while Ericaceae and other acid soil loving plants can only be grown in prepared beds, the broad-leaved kinds also in partial shade. Of course, with such a low rainfall and light soil, the plants are bound to feel the effects during a dry summer, and it is then that one wishes for a soil less shallow and a higher rainfall.

The Garden contains a good collection of plants both hardy and

under glass ; those of educational value being the first consideration, although the ornamental side is not entirely overlooked. Herbaceous borders and the Rock Garden, which have been greatly increased in recent years, are a special attraction in their seasons ; while many other attractive features could be mentioned. One of the special features is the somewhat tender plants growing in the recesses between the houses, showing how many plants can be grown with just a little protection. This is a branch of gardening my predecessor LYNCH was very interested in,* and one which is still maintained, as it is always of interest to horticultural visitors. Many plants from the Garden have been figured in the Botanical Magazine, while the other gardening periodicals have published numerous photographs and notes from time to time.

PRIMULA SONCHIFOLIA.

By Lt.-Colonel J. L. Wood.

My plants are growing in a wooded ravine eight miles south-east of Edinburgh, about 550 feet above sea level on a slope facing N.N.E. in gritty, moist and well-drained woodland soil which had not been made up at all. They receive shade from neighbouring Oak trees and seem thoroughly at home (see Figs. 49 and 50).

The rainfall locally last year was 24 inches, about 4 inches below normal, and we had the usual winter frosts. At times we experienced as much as 20° of frost last winter, and a good deal of snow fell at intervals. The plants have received no artificial shelter.

They were raised from seeds sown on June 21, 1937, as soon as they were obtainable in a more or less green state. The seedlings were planted out in July, 1938, and did not bloom in 1939, but came into flower this year and were at their best about the beginning of April.

I have sown seeds in a pot and kept it in a viney, germination taking place within ten days. Seeds in pans in a cool house germinated in forty days, and seeds in pans left outside went through the winter frosts and germinated after seven months. In all cases a generous germination took place in a mixture of equal parts of leaf mould, loam and sand.

I am not aware of any difficulties in the cultivation of this *Primula* and hence cannot give any advice to those who may have found it difficult to grow. All my flowers are pin-eyed and I select the best coloured bunch, protect it from the weather with a cloche and fertilize the flowers with a fine brush as an added protection. Then I simply sow the seeds as soon as they are available, as with other members of the 'Petiolaris' section, prick the seedlings off and treat them as *Primulas* desiring a damp, well-drained and shaded north aspect.

* See *Tender Plants for a Warm Corner*, JOURNAL of the Royal Horticultural Society, vol. 88, 1912.

SOME PLANTS IN THE SHOW.

March 20, 1940.

THE talk on "Some Plants in the Show" was given in a most interesting manner by Mrs. V. HIGGINS. She raised many interesting points about a number of plants, and the following is a *résumé* of some of her remarks.

A hybrid of the popular and handsome *Primula Winteri*, which was shown by Mrs. GWENDOLYN ANLEY, created considerable interest in the hall. Its other parent was *P. scapigera*. It arose as a seedling from a capsule produced by hand pollination and has flowered for the first time this year. The hybrid seedlings, as so often happens, were considerably more vigorous than those of *P. scapigera* sown at the same time, and it seems probable that the newcomer will prove a much more robust and quicker growing plant than its parent.

Regarding *Colchicum hungaricum* collected for W. R. DYKES in Croatia, Mrs. HIGGINS dwelt upon the confusion of names that has arisen since JANKA named it in 1882. It received an Award of Merit as *Colchicum montanum* and has also been known as *C. montanum* var. *croaticum* and as *C. croaticum*. Its leaves and flowers appear together in January and February and it has a better constitution than *C. montanum*. [There is a detailed account of the plant in JOURNAL R.H.S. 59, 67-70, 1934.]

Passing from *Colchicum* to *Crocus*, Mrs. HIGGINS described the difference between the two genera and referred to *Colchicum autumnale*, sometimes called the Meadow Saffron, which is actually *Crocus sativus*.

She described the method used by growers of cut flowers to produce the long sprays of *Euphorbia fulgens*, the small Mexican scarlet shrub now becoming so popular for indoor decoration. Instead of allowing the plants to become large and bushy, young plants produced from year-old cuttings are allowed to form long arching, slender growths, so much more attractive than the shorter flowering stems produced by the older method.

Dealing with Camellias, Mrs. HIGGINS quoted an interesting reference in the Botanical Magazine for 1789 (Vol. 2, t. 42), "but it appears to us one of the properest plants imaginable for the conservatory. At some future time it may, perhaps, not be uncommon to treat it as a Laurustinus or Magnolia; the high price at which it has hitherto been sold may have prevented its being hazarded in this way." She also referred to the immense popularity of Camellias in America and to their growing favour in this country.

The charming *Kalmiopsis Leachiana*, found by Mrs. J. R. LEACH in 1930 when riding in Co. Curry, Oregon, was also the subject of commendatory remarks by Mrs. HIGGINS. Its history is interesting; right from 1930 when Mrs. LEACH's horse tripped over a long

surface root of the plant it has attracted the attention of botanists and gardeners. It was first described as *Rhododendron Leachianum*, but in 1932 REHDER created a new genus for it, *Kalmiopsis*, the name suggested by its likeness to *Kalmia*. The inflorescence much resembles that of *Kalmia polifolia*, but the flowers have not the characteristic pouches of that plant. It is also closely related to *Loiseleuria* and *Rhodothamnus*, both monotypic genera. The distribution is very limited; it has been found only in three localities in Oregon, and REHDER recommended it should be cultivated as it is threatened with extinction in its native habitat.

LESSONS FROM THE WISLEY FRUIT TRIALS.—II.

STRAWBERRIES.

By J. M. S. POTTER, N.D.H., Fruit Trials Officer.

A COMPREHENSIVE report on the Strawberry trial at Wisley has not been made since 1933. This delay has been occasioned by the presence of virus diseases which have made it difficult to maintain healthy stocks.

During this period many new varieties have been received for inclusion in the trial, but it was considered that no useful purpose would be served by the issue of a report until it could be definitely stated that any new varieties had proved themselves superior to the established varieties.

To recommend varieties on account of their possessing desirable qualities such as flavour, etc., would only add to our existing difficulties in cultivating this crop had these varieties also been found to be highly susceptible to disease.

In endeavouring to overcome the disease problems as affecting the trials some alterations in procedure have been necessary. This aspect of the work will be dealt with more fully in a further article; the present account deals mainly with the performance of such varieties as are presently undergoing trial and of which stocks have been maintained in a satisfactory state of health and vigour for at least two years.

In the earlier trials it was customary to plant the Strawberries as intercrops between Apple trees, but it is now considered more satisfactory to devote the ground wholly to Strawberries, thus providing conditions comparable with those obtainable in commercial or private garden culture.

The procedure adopted on receiving a variety for trial is to plant it in a prepared nursery bed. Close observation is kept during the growing season and any weak or diseased plants are destroyed immediately. The plants are de-blossomed and only four runners are taken from each plant, which must be both healthy and vigorous. In this way one hundred good plants are propagated for transplanting into

the trial-bed. This practice was found necessary because the plants received for trial from the raiser or introducer were not always healthy.

New varieties are compared with three standard varieties, viz. 'Royal Sovereign,' 'Sir Joseph Paxton,' and 'Tardive de Léopold,' the comparisons being made by the Joint Fruit Testing Committee which inspects the trial beds each season.

The following is a brief summary of the behaviour of both standard and new varieties undergoing trial at Wisley.

'ROYAL SOVEREIGN.'

This remains the best early ripening variety, and is also the best for general purposes, provided a healthy and disease-free stock is obtained. Further, it must be kept in this condition by good cultivation, timely spraying to control Aphides and other pests, and the rogueing of plants suspected of being infected by disease. By carrying out these essential operations little difficulty has been experienced at Wisley in maintaining a healthy, fruitful stock of this variety.

It might be of interest to say something about so-called "strains" of 'Royal Sovereign.' Stocks of this variety have been received from different sources, some of which were said to be "strains," but it has been impossible to distinguish one stock from another by any vegetative character. The fact that one stock was more vigorous and fruitful than some other was always found to be due to the fact that the fruitful stock was, relatively, more free from disease.

'SIR JOSEPH PAXTON.'

No mid-season variety has yet been received which is likely to supersede 'Sir Joseph Paxton,' so far as flavour is concerned. This variety is, however, very susceptible to "yellow edge," and severe rogueing of infected plants is essential if a fairly satisfactory state of vigour is to be maintained. In gardens where this disease is prevalent 'Huxley Giant' is a better variety.

'HUXLEY GIANT.'

This is a variety of fair quality, but the colour of the berries is not so attractive as that of many English varieties. Though not a strong grower it does not deteriorate so rapidly with virus disease as does 'Sir Joseph Paxton.' For this reason it can be termed a good utility mid-season variety.

The origin of this variety is of interest. It was probably sent to this country by Mr. ETTER of California, under the label 'Etter 80.' The first person to receive it is not known to the writer, and the number 80 may have been lost when the plants were distributed. Many stocks of this variety have been received at Wisley under different names, such as 'Chipfiller,' 'Evesham Wonder,' 'Brenda Gautrey,' 'Huxley Giant,' and, of course, 'Etter 80.' An alternative explanation for so many stocks existing under different names may be that 'Etter 80' produces seedlings true to type, some of which have been

distributed as new varieties. As 'Huxley Giant' is the name now generally employed it may be accepted as the correct one.

'TARDIVE DE LÉOPOLD.'

This is a continental variety and is one of the most vigorous amongst the common varieties of to-day. It is very fertile and the fruit is large, dark red, with a moderately good quality. The season of ripening is late, and this variety is therefore useful for filling the season which used to be occupied by 'Waterloo'—good stocks of which are now difficult to obtain. Amateurs should note, however, that 'Tardive de Léopold' is self-sterile, that is, it produces little or no pollen, and will not fruit unless a variety such as 'Huxley Giant' is planted immediately adjoining it so that the blossoms will be cross-pollinated with pollen from 'Huxley Giant' by hive bees or other insects.

'CORVALLIS.'

This is one of a number of American varieties received from Mr. SLATE of the New York Experimental Research Station. It has been undergoing trial for a period of four years, and has shown a marked degree of resistance to disease, the vigour of the present plants at Wisley being as strong as those originally received. Fruit production is prolific; it bears many upright trusses which do not often touch the ground even when the berries are fully developed. Unfortunately the fruit is below average size and possesses the dark red colour so characteristic of many North American varieties. Flesh is very firm and juicy, but is acid, and so it cannot be recommended for dessert purposes. It would, however, appear to be a variety which possesses all the qualities necessary for jam making. The season of ripening is mid-season to late.

Other varieties received from Mr. SLATE have been 'Culver,' 'Clark,' 'Marshall' and 'Red Heart,' all of which have had to be discarded on account of their susceptibility to "yellow edge."

'AROMATIC.'

This is a new variety recently introduced by Mr. SMILES, East Sutton, Maidstone. The plants are moderately vigorous and rather spreading in habit. The fruit resembles somewhat 'Royal Sovereign' in shape, and is of an attractive colour, is firm and possesses a very good flavour. The fruit is distinguishable from any other variety at Wisley in that it is covered with short hairs, and gives off a pleasant aromatic perfume, this latter character probably explaining the name. It does not readily produce runners.

'CAMPBELL'S SEEDLING.'

This is a strong-growing variety, received from Mr. CAMPBELL, Penpont, Dumfries. It is showing promise as a prolific cropper combined with good quality, but it is yet too early to pass any opinion on its general behaviour as it has been on trial for a short period only.

‘REDBOURN.’

This is a recent introduction to the trials, sent by Mr. G. S. DUNN, Redbourn, Herts., and was raised from a cross between ‘Royal Sovereign’ and ‘Huxley Giant.’ Plants are very vigorous. Fruit is a good shape, attractively coloured and of good quality. This variety appears, however, to have inherited a character of the parent ‘Huxley Giant,’ in that the trusses are partly hidden by the foliage—a habit which tends to encourage fruit-rot during a wet season, as the foliage prevents the excess of moisture from escaping. The season of ripening is second-early.

‘AMERICAN SEEDLING.’

This is another variety of American origin, having been sent to this country by Mr. ETTER, and given the name ‘American Seedling’ by Messrs. BUNYARD, of Maidstone. The most remarkable character about this variety is its apparent resistance to virus disease, as the present stock has been at Wisley for over six years without showing much deterioration in vigour. Plants crop prolifically, but the fruit is pale whitish-red in colour and possesses a poor flavour. For those who wish a variety for jam making which is not difficult to grow, this one can be recommended.

SEEDLINGS B.K. 52, B.K. 48, B.K. 46 AND B.K. 4.

The above seedlings were received from the WEST OF SCOTLAND AGRICULTURAL COLLEGE, being seedlings raised in connection with their work on resistance to “red core root rot.” The cropping habits of these have only been observed during the past summer, and B.K. 52 and B.K. 4 produced a heavy crop of poorly coloured soft berries. B.K. 48 was of a much better colour, but was also soft. The other seedling, B.K. 46, was more promising as the berries were firmer than the others, well coloured and of good flavour. Further trial of these seedlings is necessary before any conclusion as to their value can be given.

It must be emphasized that it is necessary to grow a variety over a number of years before a true estimate of its merits can be formed. This prolonged trial is necessary in order to ascertain if the variety is highly susceptible to virus diseases, and two years is none too long to make such observation.

At Wisley it has been found that many new seedling varieties have maintained a satisfactory state of vigour and fruit production over several years, and have then degenerated seriously with virus diseases. A typical example of a variety showing this unfortunate result was ‘Western Queen.’

In the preceding notes, where no reference is made to the reaction of a given variety to any disease, it should be understood that observations on this point are as yet incomplete.

AWARD OF GARDEN MERIT.—LV.*

260. CHRYSANTHEMUM RUBELLUM.

Award of Garden Merit, April 11, 1938.

Chrysanthemum rubellum is, unfortunately, widely known as *Chrysanthemum erubescens*, under which name it was exhibited by the Director of Kew at the Autumn Show at Olympia in 1935, when it received an Award of Merit. It is also known on the Continent and in America as *Chrysanthemum pulcherrima*, under the mistaken supposition that it was a bi-generic hybrid.

Its origin is wrapped in mystery as it has been impossible to trace it beyond 1929 when it was noticed growing in the rock garden in the Happy Valley Gardens at Llandudno. It was described in JOURNAL R.H.S., Vol. 63, 265 (1938), and also described and figured in the Botanical Magazine, t. 9566 (1939).

To the gardener, however, doubts or difficulties about its name and origin which are set out in the two sources mentioned above are of less importance than the sterling worth of the plant for the herbaceous border.

A shapely plant, between 2 and 3 feet in height, it is distinguished by the great freedom with which it produces its silvery pink flowers about 2 inches in diameter (Fig. 52), the delicate rays offset by the rich gold of its disk. Hardy, easy to propagate from cuttings, it may justly claim a place among the best herbaceous plants and is a welcome addition to the display in September and October. For cutting, the elegant sprays are much appreciated and the flower colour is considerably enhanced when seen by artificial light.

Variations in size and colour of the flowers are attracting the attention of nurserymen and two named varieties, 'Anna Hay' and 'Clara Curtis,' have already made their debuts.

261. MALUS HUPEHENSIS.

Award of Garden Merit, June 2, 1930.

Once more it is necessary to regret that a popular garden plant should have become widely known under a name which cannot be allowed to remain, as the beautiful plant usually known as *Malus theifera* must now bear the name of *M. hupehensis*. The circumstances which led

* Notes on plants which have received the Award of Garden Merit have been gathered together and published with the title *Some Good Garden Plants*. This can be obtained on application to the Secretary, R.H. Society, price 4s. Additional notes appeared in the JOURNAL R.H.S., vol. 68, pp. 190, 246, 448 and 546; 64, pp. 134, 232, 290, 374 and 484; 65, pp. 60, 97 and 123.

REHDER to name the plant *M. theifera* in ignorance of the fact that PAMPANINI had already named it *hupehensis* (under *Pyrus*) are described in the Journal of the Arnold Arboretum, 14, p. 207 (1933).

His esteem of the species is shared by many gardeners in this country ; it forms a shapely tree of about 25 feet in height, and its ovate leaves, up to 4 inches long and 2 inches wide, are borne on stalks about an inch in length. When young the leaves are tinged with purple, but with age they become dark green above and pale green beneath with a light down on the midrib and large veins. The flowers appear in great profusion in April and are about 1½ inch across, tinged with pink in the young stage but becoming white when fully expanded (Fig. 53). The fruits are globose, small, pale yellow, tinged with bright red on the exposed side.

It is widely distributed in Central and Western China and also extends to Assam ; it was introduced into cultivation by Messrs. J. Veitch & Co. in 1900, who received it from WILSON, at that time collecting for the firm.

A rosy pink form, which originated at Coombe Wood in 1900, was discovered in W. Hupeh by WILSON and has been named *rosea*. This variety, as well as the type plant, flourishes at Wisley, and both have received the Society's Award of Merit.

PLANTS TO WHICH AWARDS HAVE BEEN MADE IN 1940.

Adonis Davidi. A.M. April 16, 1940. An attractive plant, about 4 inches high with much divided foliage ; the flowers are about 1½ in. diameter, pure white within and marked outside with blue lines (H.C.C. French Blue 43/3), fading towards the base of the petals. It is a perfectly hardy plant for the rock garden. Shown by T. Hay, Esq., C.V.O., V.M.H., New Lodge, Hyde Park, W. 2.

Aerides Vandarum var. 'Delicate.' A.M. April 16, 1940. A native of the Khasia Hills, and described by Reichenbach in 1867. It is figured in the Botanical Magazine, t. 4982, under the erroneous name *Aerides cylindricum*. The present example bore a spike of six flowers, which are white slightly flushed with pink. Shown by Messrs. Sanders, St. Albans.

Aquilegia Jonesii. A.M. April 2, 1940. A charming little American species of value as a foliage and flowering plant for the alpine house and rock garden. The small tufted leaflets are pale green, borne just above the soil, and the flowers are of a bold shade of Aster violet (H.C.C. 38/2). The spurs, of a slightly deeper shade, are up to 1½ inch long, and the sepals and petals about ½ inch long. The diameter of the flower is about 1½ inch. Shown by Dr. P. L. Giuseppi, Trevose, Felixstowe.

Clivia 'Hamilcar.' A.M. April 2, 1940. From Lionel de Roth-

schild, Esq., O.B.E., V.M.H. (gr. Mr. F. Hanger), Exbury, Southampton. The flowers are of very good form, 4 inches diameter, Saturn red (H.C.C. 13/1), with lemon-yellow (H.C.C. 4/3) at the base of the broad rounded segments. The plant exhibited carried a fine umbel of 16 flowers, and the variety was raised by the exhibitor.

Clivia 'Hannibal.' A.M. April 2, 1940. From Lionel de Rothschild, Esq., O.B.E., V.M.H., Exbury, Southampton. The flowers are of excellent form, 4 inches in diameter, Nasturtium red (H.C.C. 14), with Buttercup yellow (H.C.C. 5/2) at the base of the broad rounded segments. The plant exhibited carried an umbel of 9 wide-open flowers, and the variety was raised by the exhibitor.

Cymbidium × 'Altair,' Exbury var. A.M. April 2, 1940. This showy hybrid bore a spike of 13 flowers, mainly of bronze-yellow colour, the labellum spotted with reddish crimson. The result of crossing *C. Pauwelsii* with *C. 'Pipit.'* Raised and exhibited by Lionel de Rothschild, Esq., Exbury.

Cymbidium × 'Balkis,' Exbury var. A.M. April 2, 1940. This plant bore an erect spike of 6 flowers, blush tinted and rendered particularly attractive by the expansive labellum with its broad rose-coloured margin and crimson spotting. The result of crossing *C. Alexanderi* with *C. 'Rosanna.'* Raised and exhibited by Lionel de Rothschild, Esq., Exbury.

Cymbidium × 'Janette' var. 'A. McBean.' F.C.C. April 2, 1940. This is one of the best hybrids of its kind. The robust plant carried 2 spikes, each with 7 flowers, 5 inches in width, and of yellowish colour tinged with green, the labellum lighter and marked with a few crimson spots. The result of crossing *C. 'Joy Sander'* with *C. Alexanderi*. Raised and exhibited by Messrs. J. & A. McBean, Cooksbridge.

Cymbidium × 'Queen Mary.' A.M. April 2, 1940. A strong-growing plant which carried a couple of spikes with 7 and 8 flowers respectively; the sepals and petals are white, and the labellum heavily marked with crimson. The result of crossing *C. 'Jason'* with *C. 'Flamingo.'* Raised and exhibited by Messrs. H. G. Alexander, Tetbury.

Laeliocattleya × 'Orange Beauty.' A.M. April 16, 1940. The rich orange colour of this hybrid renders it particularly attractive, and it is almost uniformly displayed in all the segments. The result of crossing *Lc. 'Orange Blossom'* with *Lc. 'Orange Gem.'* Raised and exhibited by Messrs. H. G. Alexander, Ltd., Tetbury, Glos.

Narcissus 'Content.' A.M. April 16, 1940, as a variety for exhibition. An attractive Daffodil of variable proportions, classified as a bicolor Trumpet variety (Division 1c), with flowers about $4\frac{1}{4}$ inches in diameter, borne on stout 20-inch stems. The white perianth segments had a slight twist, the outer ones being about 2 inches long and a little less in width. The corona, which was slightly expanded at the mouth, was pale canary-yellow at the margin, gradually passing to cream at the outside of the base. It averaged about the same length as the segments and was about seven-eighths as much in diameter at

the margin. Raised by the late P. D. Williams and shown by Mr. Guy L. Wilson.

Narcissus 'Dervish.' A.M. April 16, 1940, as a variety for exhibition. A well-formed, medium-sized Incomparabilis variety (Division 2a) with flowers 4 inches in diameter, well poised on wiry 18-inch stems. The perianth segments, which were lemon-yellow faintly suffused with orange-red, were smooth and flat, the outer ones being 1½ inch long and 1⅓ inch broad. The marigold-orange, neat, cup-shaped corona was ¾ inch long and about 1 inch in diameter at the mouth. Raised and shown by Mr. Guy L. Wilson.

Narcissus 'Elgin.' A.M. April 16, 1940, as a variety for exhibition. A richly-coloured, yellow Trumpet variety (Division 1a) with flowers about 5 inches in diameter, well poised on stout 18-inch stems. The canary-yellow perianth segments were smooth, broad and overlapping, the outer ones being about 2½ inches long and 1⅔ inch broad. The deep chrome-yellow trumpet, which was slightly expanded, indented and reflexed, was just the length of the segments and about 2¾ inches in diameter at the margin. Raised by the Brodie of Brodie and shown by Mr. Guy L. Wilson.

***Narcissus 'Fortune's Bowl.'** A.M. March 22, 1940, as an early variety for cutting from the open for market. A vigorous, fairly free-flowering, Incomparabilis variety (Division 2a). The stem was 20 inches long, medium to thick, stiff and very firm, and the flower was very well posed. The perianth was 4 inches in diameter, the incurving primrose-yellow segments overlapping for rather more than half their length. The orange-red corona was 1½ inch wide and 1 inch deep, with an orange base, the mouth being expanded, while the margin was slightly reflexed and serrated. The flowering period commenced at Gulval on March 3, 1938, March 8, 1939 and March 14, 1940. Raised by the Brodie of Brodie and sent for trial by Mr. R. F. Calvert, Coverack, Cornwall.

Narcissus 'Kanchenjunga.' A.M. April 16, 1940, as a variety for exhibition. A large, creamy-white Trumpet variety (Division 1b) with flowers about 5½ inches in diameter, borne on stout 16-inch stems. The perianth segments were smooth, broad and overlapping, the outer ones being 2½ inches long and 2¾ inches broad. The trumpet, which was yellow at the base within, was 2½ inches long and about 2¾ inches at its expanded mouth. Raised and shown by Mr. Guy L. Wilson.

***Narcissus 'St. Keyne.'** A.M. March 22, 1940, as an early variety for cutting from the open for market. A vigorous, free-flowering, Tazetta hybrid (Division 8). The stems were 18 to 19 inches long, thick and firm, with two or three well-posed flowers on each. The perianth was 2¾ inches in diameter, the white segments overlapping for more than half their length, three tending to incurve and three to recurve. The corona, which was ¼ inch wide and ¾ inch deep, was expanding, and orange-red with a deep orange base and daintily frilled margin. The flowering period commenced at Gulval on February 26,

* After trial at Gulval.

1938, March 4, 1939, and March 12, 1940. Raised by the late P. D. Williams and sent for trial by Mr. M. P. Williams, Lanarth, St. Keverne, Cornwall.

Narcissus 'Truth.' A.M. April 16, 1940, as a variety for exhibition. A refined, white, giant *Leedsii* variety (Division 4a) with flowers about $4\frac{1}{2}$ inches in diameter, borne on stout 19-inch stems. The very smooth, overlapping perianth segments were 2 inches long and not quite $1\frac{1}{2}$ inch broad. The neat corona, which was slightly reflexed at the mouth, with a pale yellow base within, was $1\frac{1}{2}$ inch long and about as much in diameter at the margin. Raised and shown by Mr. Guy L. Wilson.

***Narcissus 'Winkfield's Dower.'** A.M. March 22, 1940, as an early variety for cutting from the open for market. A vigorous, free-flowering, yellow Trumpet variety (Division 1a). The stems were 19 to 20 inches long, of medium thickness, and the flower was very well posed. The perianth was $4\frac{1}{2}$ inches in diameter, the incurving and twisted sulphur-yellow segments overlapping for one-third of their length. The chrome-yellow corona was 2 inches deep and $1\frac{1}{2}$ inch wide, with an expanded mouth and crenate margin. The flowering period commenced at Gulval on March 4, 1938, March 8, 1939, and March 13, 1940. Raised by Mr. Guy L. Wilson and sent for trial by Mr. R. F. Calvert.

Pelargonium 'Carmine.' A.M. April 16, 1940. A very handsome Regal Pelargonium raised by Mr. E. Humphris from an unnamed seedling. The large rounded flowers with crinkled edges are borne in well-formed trusses. The upper petals are Tyrian Rose (H.C.C. 24/1) feathered and blotched with crimson-maroon, the lower petals are rosy-carmine. Shown by R. F. W. Cartwright, Esq., Aynho Park, Banbury.

Prostanthera Sieberi. A.M. April 2, 1940. From the Director, Royal Botanic Gardens, Kew. A very floriferous Australian shrub suitable for the cool greenhouse, where it is capable of forming a bush nearly 10 feet high. The growths branch copiously, producing innumerable slender branchlets bearing small, dark green, ovate leaves and terminal racemes of two-lipped flowers of Bishop's violet (H.C.C. 34/3).

Rhododendron × 'Elsae' var. 'Clyne' (*R. grande* × *R. Hodgsonii*). A.M. April 2, 1940. A hardy flowering plant for the woodland garden. The close-set truss is about 7 inches in diameter composed of 30 funnel-shaped flowers. The flowers are about 2 inches long by about $1\frac{1}{4}$ inch wide, pale Fuchsia purple (H.C.C. 28/3). The edges of the outside of the lobes are stained with a deeper shade (H.C.C. 28/2). The lanceolate leaves are up to 10 inches long by about 3 inches broad, mid-green, glabrous above and lightly felted, with pale fawn tomentum beneath. Shown by Admiral A. Walker-Heneage-Vivian, Clyne Castle, Blackpill, Swansea.

Rhododendron × 'Ethel' (*R. 'F. C. Puddle'* × *R. repens*). **F.C.C.** April 2, 1940. A hardy flowering plant for rock-garden and general garden purposes. The plant is about 18 inches across and 8 inches high, carrying 23 loose trusses composed of 4 to 5 trumpet-shaped flowers, 1½ to 2 inches deep and 1¼ to 2 inches wide. These are of a rich shade of light crimson-scarlet, and the coloured calyx is of the same shade. The pale green, glabrous, oblanceolate leaves are about ¼ inch broad and 2 inches long. Raised and shown by Lord Aberconway, Bodnant, N. Wales.

Rhododendron × 'Grand Prix' (*R. grande* × *R. eximium*). **A.M.** April 2, 1940. A hardy flowering plant for the woodland garden. The flat-topped truss, about 8 inches in diameter, is composed of 22 flowers, borne on bright red pedicels 1½ inch in length. The flowers are funnel-shaped, 2 inches deep by about 2½ inches wide, ivory in colour, shaded without pale carmine (H.C.C. 21/3). The backs of the lobes are stained at the edge with a deeper shade of carmine. The narrowly obovate leaves are up to 9 inches long by 4 inches wide, pale green, glabrous above and covered with heavy fawn tomentum beneath. Raised and shown by Admiral A. Walker-Heneage-Vivian.

Rhododendron mishmiense (K.W. 8113). **A.M.** April 16, 1940, as a flowering plant for the cool greenhouse. The loose, flat truss, 6 inches in diameter, is composed of eight widely funnel-shaped flowers with recurving lobes. They are 2½ inches in diameter and about 1 inch deep, pale yellow (H.C.C. Aureolin 3/2), slightly spotted brownish-red within on the three upper lobes. The mid-green, narrowly ovate leaves are up to 5 inches long by 2½ inches wide, glabrous beneath and slightly pubescent above. Shown by Lionel de Rothschild, Esq., Exbury, Southampton.

Rhododendron × 'Seagull' var. 'Seamew' (*R. sutchuenense* × *R. Loderi*). **A.M.** April 16, 1940, as a hardy flowering plant for the woodland garden. The large spherical trusses are about 8 inches in diameter, composed of up to fifteen flowers. These are funnel-shaped and up to 4 inches wide by about 2½ inches deep, pure white. The dark green, oblanceolate, glabrous leaves are up to 7 inches long by about 2½ to 3 inches wide. Raised by the Dowager Lady Loder and shown by Sir Giles Loder, Leonardslee, Horsham.

Rhododendron × 'Sulfmeg' (*R. sulfureum* × *R. megeratum*). **A.M.** April 2, 1940. A hardy flowering plant for the rock garden. The trusses are composed of 2 or 3 flowers which are borne on ½-inch-long pedicels. The flowers are about 1½ inch wide by ½ inch deep, broadly funnel-shaped, pale sulphur-yellow (H.C.C. 1/3). The outside of the flower is of a slightly deeper shade. The leaves are obovate, about 1½ inch by about ¾ inch wide, pale green and glabrous above, the under surface and midrib covered all over with minute cells of a bright reddish colour. Raised and shown by E. J. P. Magor, Esq., Lamellen, St.Tudy, Cornwall.

Rhododendron × 'White Glory' var. 'Pink Glory' (*R. irroratum* × *R. Loderi*). **A.M.** April 16, 1940, as a hardy flowering plant for the

woodland garden. The spherical truss, up to 7 inches across, is composed of up to eighteen funnel-shaped flowers, $3\frac{1}{2}$ inches wide by 2 inches deep. The flowers are blush-pink, stained without Rose Madder (H.C.C. 23/3). The dark green, oblanceolate, glabrous leaves are up to 4 inches long by $1\frac{1}{2}$ inch wide. Raised by the Dowager Lady Loder and shown by Sir Giles Loder.

Saxifraga marginata var. karadzicensis. A.M. April 16, 1940. A neat, tufted Saxifrage, bearing pure white flowers, $\frac{1}{2}$ inch in diameter, on 1-inch stems; recommended for the alpine house or the rock garden. Shown by Messrs. W. E. Th. Ingwersen, Ltd., Birch Farm Hardy Plant Nursery, Gravetye, East Grinstead.

Shortia uniflora grandiflora 'Snowflake.' A.M. April 2, 1940. The Japanese *Shortia uniflora* is an evergreen creeping sub-shrub 3 to 6 inches high, with neat, shining, leathery leaves an inch or so across and delicately fringed, pale pink flowers. The present variety, raised by the exhibitor, is a vigorous plant producing extra large white flowers with the greatest freedom. Shown by Mr. W. J. Marchant, Keepers Hill Nursery, Stapehill, Dorset.

BOOK REVIEWS.

"Dwarf Trees (Bonsai)." By Shinobu Nozaki. 8vo. 84 pp. Ill. (Sanseido Co., Tokyo and Osaka, 1940.) 2os.

Mr. Nozaki has taken the trouble to explain to the western world why the Japanese people like dwarf trees so much and exactly how they produce them. Such disinterested enthusiasm will be respected by all English gardeners, but most of them will probably feel that the subject is remote from their taste and that it has been developed with a virtuosity which they are unlikely to appreciate. Yet, if we read the book and look receptively at its photographs (116 in number), we begin to realize that the Japanese get from their dwarf trees very much what we get from our rock gardens, the impression of that kind of wild landscape, for which the townsman is apt to have a peculiar longing.

The most highly valued dwarf trees are the old plants which have been naturally dwarfed by exposure and starvation on the high mountains, and the forms they assume are characteristic of the craggy Japanese landscape and evoke it; they are the equivalent of our "wind-warped upland thorn."

The dwarfs which have been produced by grafting on to old stocks or by training seedlings and layers are regarded, more or less leniently, as reproductions of the antique, for the Japanese set the same high value on natural antiquities as we reserve for man's handicraft. The mortality among old plants transferred from the mountains is very high and the difficulty of keeping them alive in the shallow pans, which Japanese aesthetics demand, exacts skilled and almost constant attention, so it is unlikely that we shall be tempted in this country to cultivate these slightly conventionalized masterpieces of antiquity; but they might set us thinking about the beauty of an ancient plant of a dwarf Rhododendron or Willow and how to display it to best advantage—unless our hearts are given wholly to the sprightly charm of youth.

JASON HILL.

"The New Systematics." Edited by Julian Huxley. 583 pp. (Oxford Clarendon Press, 1940.) 21s.

It cannot be pretended that this is a book for the working gardener or even that it has much immediate bearing upon horticulture. But it is an important book to readers who are interested in the origin of plants and animals. It consists of essays by twenty-two biologists, each dealing with the bearing of

some modern branch of biology upon systematics. Systematics we may say began with Linnaeus and is the science of the classification of living organisms, its object being to exhibit relationships and ultimately to provide some sort of genealogical tree. While at first systematics had nothing more to work upon than the visible structure of the organism, each succeeding development of biology provided fresh material and a new line of approach. There had grown up a tendency to despise systematics as little more than a formal exercise in labelling, something akin to the work of the bibliographer or the philatelist, but when it calls in the aid of modern experimental biology it becomes a study of the material upon which evolutionary theory is based. Modern genetics and cytology, and the examination of wild populations, for example, lead to a very different idea of a "species" than even Darwin possessed, and the examination of what a "species" is leads us a long way towards knowing how it came to be. Some of the essays make pretty heavy going, but the book as a whole presents an impressive introduction to the way the younger biologists are thinking of the problem of evolution.

"The Skeptical Gardener or Potterer's End." By Humphrey John, with a foreword by J. W. Robertson Scott. 8vo. 263 pp. Ill. (Harrap, London, 1940.) 11s.

Many of our Fellows must be already acquainted with the writings of Dr. H. J. Denham because they are also readers of that delightful quarterly *The Countryman*, where he discourses regularly under the transparent synonym that stands on the title page of this book. But in case you are not as yet familiar with Dr. Denham as a gardener do not be put off by the idea that this is only another of those accounts of "How I made a Garden" by the enthusiastic amateur with more skill in exploiting his fantasies than experience in handling the soil. For Dr. Denham is a rare combination, a man of science—botanist and engineer—who shares in that immense knowledge of outdoor plants possessed by a few individuals attached to gardens like Kew, Edinburgh and Wisley, and by a select body of amateurs. In addition to the scientific background that informs every chapter, Dr. Denham is also a craftsman who works with his own hands. "Your good gardener—I may be prejudiced, but I regard a gardener as good if he makes his own plants, just as I hold a fisherman to be good if he ties his own flies—your good gardener seldom buys his plants. It is not a matter of reluctance, or meanness of spirit, or lack of generosity, for when he does buy he does so in grand manner, and when he gives he gives by the car load, knowing well that many plants are needed to furnish the smallest garden; but simply that he seldom has to, for, as it is written, 'unto every one that hath shall be given.' Growing as he does far more than he can use—since a natural diffidence impels him to expect a much smaller measure of success in his operations than is justified by the event, and, consequently, to set more cuttings, grafts and buds, and more seeds than he requires—he always has a surplus for distribution."

From this alone the quality of Dr. Denham as a gardener may be assessed; further reading will reveal his adventurousness. On the face of it this book is an account of what the writer has succeeded in growing in a Cotswold garden, not too rich in its limey soil and with a river at the bottom. It deals not only with flowering Cherries, Roses, and other shrubs, with bulbs and the herbaceous border, but also with fruit and again with the kitchen garden. There his text is vegetables for the gourmet as against the show table or the market, the two prime causes of deterioration in English vegetables. Dr. Denham even has views on how flavour may be attained by judicious manuring and cultivation.

This indeed is the note of Dr. Denham's book; there is no chapter in which the reader will not find some observation which may perhaps enlarge his knowledge but will certainly stimulate him to consider his own practice. Dr. Denham makes frequent mention of the Society and of the Wisley Gardens, always appreciative if sometimes asking for more.

It would be pleasant to follow further in Dr. Denham's footsteps; we must be content with recording our opinion that his book is one of outstanding merit, likely to become one of the minor classics of gardening literature.

JOURNAL OF THE ROYAL HORTICULTURAL SOCIETY

Vol. LXV

Part 7



11. SEP. 1940

July 1940

THE SECRETARY'S PAGE.

OWING to the war situation it was considered advisable to cancel the two Fortnightly Shows in June and that of July 2 and 3, and notices to this effect were sent to the Daily and Horticultural Press, besides being advertised in the "Personal" columns of *The Times* and *Daily Telegraph* and broadcast by the kindness of the B.B.C. It will have been noticed that a special slip of cancellation was attached to the cover of the June JOURNAL.

There will be no shows for the present, but should circumstances permit the resumption of shows the same method will be adopted with regard to future announcements.

LECTURE PROGRAMMES FOR THE AUTUMN AND WINTER.

It is now the time to consider programmes of demonstrations in actual gardens and allotments and of lectures for the Autumn and Winter months. These will be especially appreciated by the many beginners who will be glad of the opportunity to learn and to be able to rectify mistakes of their first year of gardening.

Fellows and Associates, and especially Affiliated Societies, are therefore reminded of the Society's panel of lecturers and demonstrators which has been drawn up in agreement with the Ministry of Agriculture and Fisheries. The lecturers and demonstrators give their services free and only the cost of their out-of-pocket expenses has to be met. All applications should be addressed to The Secretary, Royal Horticultural Society, Vincent Square, Westminster, S.W. 1, giving the time, date and location of the lecture or demonstration. The production of vegetables is a matter of national importance. Improved cultivation saves seeds and eliminates wasteful production.

PRACTICAL DEMONSTRATIONS AT WISLEY.

The practical demonstrations at Wisley will continue and will be held (weather permitting) on the following dates :

July 17 and 18, 2 to 4 P.M.—Summer Pruning of Shrubs.

August 21 and 22, 2 to 4 P.M.—Vegetative Propagation of Plants.

In order that arrangements may be made those Fellows desiring to attend should notify the Director of the Gardens beforehand.

LILY GROUP.

The visit of the Lily Group to the Royal Botanic Gardens, Kew, on Saturday, July 6, has been cancelled, but at the time of going to press the following arrangements still stand :

Tuesday, July 16.—Discussion at 3 P.M. in the Lecture Room of the New Hall in Greycoat Street on the Lilies exhibited.

At 7 P.M. Members of the Lily Group and their friends will dine together in the Restaurant of the New Hall.

RED CROSS SALE, SEPTEMBER 24 AND 25, 1940.

A great number of gifts in kind and in money has been received and it is hoped that a great number more will still be forthcoming. It is particularly desirable that notification should be made at once, as the compilation of the catalogue is in hand and it will be regrettable if some of the lots are unable to be included.

The catalogue will have an attractive cover designed by Mr. Oliver Messel, and will be purchasable at 2s. 6d. for the benefit of the fund. Applications enclosing 2s. 6d. should be sent as soon as possible to The Secretary, Red Cross Fund, Royal Horticultural Society, Vincent Square, Westminster, S.W. 1, and the catalogue will be forwarded when ready.

BRITISH DIPLOMA OF FLORAL ART.

At the Society's Spring Examination for the Floral Art Diploma, which was held on April 25 and 26, eight candidates entered and all were awarded the Diploma as follow : Miss Joyce Mary Dyson, Miss Esther Peltz, Miss Margaret Avis Penistan, Miss Margaret Dorward-Phillip Ritchie, Mrs. Agnes Mary Simpson, Miss John Loftus Tottenham, Miss Gladys May Warren and Mr. Arnold Cooper Francis.

GENERAL EXAMINATIONS.

The following are the results of this year's General Examinations held on March 7, 1940 :

SENIORS.

Four hundred and twelve candidates entered for this Examination, and of these

20 were placed in Class 1.

66 " " " " 2.

139 " " " " 3.

158 candidates failed. 29 were absent.

A Silver-Gilt Medal is awarded to Miss Ruth Mary Wooler, of Studley College, Studley, Warwickshire, who was First.

JUNIORS (under 18).

One hundred and forty-eight candidates entered for this Examination, and of these

8 were placed in Class 1.

29 " " " " 2.

78 " " " " 3.

32 candidates failed. 1 was absent.

A Silver Medal is awarded to Mr. Owen Edwards, of 73 Merval Crescent, Liverpool, 4, Lancs., who was First.

COLORADO BEETLE.

The Minister of Agriculture and Fisheries asks that notice may be drawn to the Colorado Beetle.

In view of the great multiplication of the Beetle in Western France and of the abnormal conditions at present prevailing, the risk of the introduction of the Colorado Beetle into this country is not likely to be less than in previous years, and it is of the utmost importance that any specimens of the Beetle that may arrive in this country should be detected and dealt with before they have had time to multiply.

The Ministry of Agriculture and Fisheries is accordingly anxious to obtain as early notification as possible of the discovery of the pest in this country.

Any yellowish beetle with black stripes or any red or reddish-yellow grub that is found feeding upon potato leaves should be regarded with suspicion. When suspected Colorado Beetles or grubs are discovered, specimens should be placed in a tin box (in which no holes should be punched) with a piece of potato leaf, and the box should be sent to the Ministry of Agriculture, 10 Whitehall Place, London, S.W. 1, with a letter stating the exact place where the insects were caught and the name and address of the finder.

PUBLICATIONS.

"Simple Vegetable Cooking."

The Society, in co-operation with members of the Ministry of Agriculture and Fisheries, Instructresses in Rural Domestic Economy, the Association of Teachers of Domestic Subjects, the National Federation of Women's Institutes, the National Union of Townswomen's Guilds and members of the Royal Horticultural Society's Fruit and Vegetable Committee, have now produced a companion volume to the Ministry's "Food from the Garden," entitled "Simple Vegetable Cooking," and copies of this may be obtained from the Society. It describes the principles of cooking and serving vegetables and contains simple recipes particularly useful to the small householder with a simply equipped kitchen. Price 3d., by post 4½d.

"Preserves from the Garden."

The Ministry of Agriculture and Fisheries is bringing out a further Bulletin No. 3 in the "Grow More Food" series entitled "Preserves

from the Garden." This bulletin will be published shortly and will be obtainable through the Society or by direct application to H.M. Stationery Office, York House, Kingsway, London, W.C. 2. Price 4d. net, with a bulk rate of 27s. 6d. per hundred copies, carriage extra.

"Pests and Diseases in the Vegetable Garden."

The important "Growmore" Bulletin No. 2 of the Ministry of Agriculture and Fisheries, "Pests and Diseases in the Vegetable Garden," is now obtainable, price 6d., and the Society has been informed that for Horticultural Societies, Allotment Societies, and similar bodies this leaflet is obtainable at £2 per hundred copies, carriage extra.

THE LATE CANON A. T. BOSCAWEN.

A fund has been opened to commemorate Canon A. T. Boscawen. He was a great amateur gardener and his influence on behalf of horticulture in Cornwall is well known. Many Fellows who may have benefited by his encouragement and generosity may like to subscribe. The subscription is limited to one guinea and should be addressed to Col. E. H. Bolitho, Barclays Bank, Penzance.

SEED SAVING.

Fellows, Associates and Affiliated Societies are reminded of the importance of saving such vegetable seeds as they can. This applies especially to Peas and Beans at the present moment. It would be a wise precaution to allow a portion of vegetable crops, such as Carrots, Onions, etc., to set seeds.

AGRICULTURAL WAGES.

With regard to the new agricultural rate which came into force on June 30, persons who employ gardeners and who are in doubt whether their employees come under the Act or not should make inquiries at the Ministry of Agriculture and Fisheries, King's Buildings, Dean Stanley Street, Westminster, S.W. 1. The new rates make no change in the definition of an agricultural labourer. The Society understands that persons engaged upon work in private gardens are not employed in agriculture within the meaning of the Agricultural Wages Regulation Act, 1924, unless the produce of the gardens is grown wholly or mainly for sale. Employment in agriculture is defined in the Act as including employment in connexion with the use of land as orchard land, market gardens or nursery grounds.

WISLEY IN JULY.

ESPECIALLY attractive this month are the rock garden, where a great variety of plants is in flower, the Wild Garden with Lilies, Campanulas and Primulas, the Heath Garden, the species of Rosa in Howard's Field, and the herbaceous border with its large collection of modern plants now at, or approaching, the flowering stage.

Some interesting and ornamental plants are to be seen in the glasshouses. In the Half-Hardy house, nearest to the laboratory, are the salmon-red *Alstroemeria haemantha*, crimson-flowered *Pelargonium Schottii*, the Lupin-like, shrubby *Ebenus cretica* with rosy spikes of flowers, the china-blue *Oxypetalum caeruleum*, a native of Argentina, and the climbing *Mutisia decurrens*, with large brilliant orange flowers.

The collection of Fuchsia species and hybrids is particularly noticeable in the Temperate house, but in addition the semi-double rose-pink form of the Oleander blooms at this season, besides that striking blue-flowered shrub, *Solanum Wendlandii*, trained on a support on the eastern side of the house; a true climbing plant is the dark red *Gloriosa Rothschildiana*, to be seen also in the adjacent seed-house, while Pelargoniums and the creeping magenta-coloured *Heeria elegans* add their quota to the general effect in the house.

Of plants on trial this year and in the standard collections, Gladioli, Sidalceas, Border Carnations, and Heucheras flower in July and will be found in the trial grounds on the hill, on the way to the principal Rose borders in King's Avenue. The border of annuals is a feature to which visitors pay especial attention each year, appreciating its low initial cost and upkeep in relation to the length of the flowering period which it can provide. This border will be found adjacent to the Pear orchard by the path leading up to the Alpine house. Eschscholzias, Dimorphothecas, Ursinias, and Tropaeolums (*Nasturtiums*) are some of the annuals which flower now, others succeeding and continuing the display into August and September.

In the Alpine house species of Campanula will be in evidence, such as *C. lasiocarpa*, *C. Zoysii*, and *C. Piperi*; large pans of the Japanese, shade-loving *Conandron ramondioides*, the useful *Linaria crassifolia*, *Paronychia nivea* with its white, papery heads, the delicate-looking *Thalictrum kiusianum*, and the unusual pink *Theropogon pallidum*, as well as that most handsome of Saxifrages, *S. longifolia*, and others of this type bearing large inflorescences.

Of the many plants which flower in the rock garden in July only a small number can be mentioned here. They must include *Achillea clypeolata* for its fine silvery foliage and yellow heads, the Chinese *Codonopsis clematidea* with pale blue bells, the creeping *Campanula arvatica*, species of Geranium such as *G. Farreri* and *G. sanguineum*, *Primula alpicola*, and *Spenceria ramalana* with pinnate foliage and yellow flowers resembling those of a *Potentilla*. In the bog garden at the foot of the slope the purple *Orchis foliosa*, and dwarf but very showy *Lychnis Haageana*, besides the variously hued Japanese Irises along the side of the pond, are most conspicuous.

Under the shade provided by the Oak trees in the Wild Garden a variety of Lilies from many countries is established and is now to be seen in bloom. The incomparable *L. regale*, tall yellow *L. Szovitsianum* from the Caucasian mountains, the Chinese *L. Willmottiae* with reflexed orange-red flowers, and the charming white *L. Duchartrei* of the same Martagon section are some of them. *Campanula latifolia* var. *alba* and

the pale blue *C. lactiflora* also flourish here, with the Goat's Beard, *Spiraea Aruncus*, and the giant Tibetan *Primula Florindae* on the side of the ditch ; of shrubs *Magnolia Watsonii* is easily detected by its remarkably pungent scent, and some late-flowering Rhododendrons, hybrids of *R. discolor* and *R. auriculatum*, and the highly fragrant *R. arborescens*, one of the Azalea group, are worth noting for similar situations.

In Seven Acres it is most probable that, owing to the damage caused by the severe winter, there will be considerably fewer flowers on the shrubs than is normal at this time. The Escallonias, Coton-easters, and certain species of Veronica for example, will be devoting their energies to growth rather than to flowering, but species of *Spiraea*, including the tall white *S. ariaefolia* and dwarf rose-coloured *S. japonica* var. *Bumalda*, with some of the later Berberis, *Hypericum patulum* forms, Deutzias and *Philadelphus* will help to make up for the absentees. The Water Lilies in the pond will now be attractive with crimson and white flowers lasting over a long period (fig. 54).

The same factor applies in part to the Heath Garden, where many of the brightly-coloured forms of the Scotch Heather, *Erica cinerea*, as well as the Connemara Heath, *Daboecia polifolia*, will not be sufficiently recovered to flower this year. Nevertheless others should be in evidence to take their places, particularly the tall Corsican Heath, *E. terminalis*, the grey-leaved *E. Tetralix* var. *mollis*, and the hybrid *E. Stuartii* with flowers of two tones of rose. Both *Genista aethnensis* and the Spanish Broom, *Spartium junceum*, suffered damage in the winter and will not be flowering with their usual freedom this month. In Howard's Field, beyond the Pinetum, a wholesale slaughter by frost of the large collection of Cistuses and allied genera has necessitated their removal, but the many species of Rosa along the river bank and in other borders beyond are for the most part unaffected and will be flowering as usual. The pink *R. Davidii*, *R. multibracteata*, and the attractive white *R. Soulieana* are some to be seen now, while the fruits of those which bloomed in May are approaching maturity.

Returning to the main part of the Gardens, the Award of Merit garden should be visited to see the large plantings of *Helenium autumnale* 'Moerheim Beauty' with red flowers, the pale lilac *Erigeron speciosus* 'Quakeress,' and blue-purple *Salvia superba*. Two excellent shrubs here also are the large double white *Philadelphus* 'Virginale' and *Deutzia Monbeigii*, the latter with quantities of starry, pure white flowers.

The herbaceous border should not be missed, since it is weekly becoming gayer as plants arrive at the flowering stage : *Alstroemeria* 'Dover Orange,' *Anchusa* 'Morning Glory,' *Polygonum paniculatum*, and the tall branching *Verbascum paniculatum* being some of the most notable and conspicuous at the present time, with many others which contribute to a good border fast coming into flower.

THE KITCHEN GARDEN IN JULY.

THOUGHTS this month must be directed towards the period in late winter and early spring when fresh vegetables are usually scarce and expensive. In order that the period of scarcity may be shortened as much as possible, it is now necessary to plant out as many Brassicas as the garden can conveniently contain.

In northern districts, during the last week of the month, sowings of Cabbages of such varieties as 'Ellam's Early' and 'Flower of Spring' should be made; gardeners in southern districts may delay this important operation until the first week in August. Ground from which Potatos have been cleared will be found very suitable to receive these sowings.

Good breadths of Broccoli, Kale and Savoys should be planted, and if the planting of Brussels Sprouts was not completed last month there is still time to put in a sufficient number of plants to provide a good supply in due course. Further sowings should now be made of stump-rooted Carrots, round Beet and Lettuce, and towards the end of the month a broad-leaved Batavian Endive may be sown. A short row of Parsley should also be sown during the month for winter use, and, as plants of Herbs are just beginning to come into flower, sprays should be cut, dried and stored until they are required during the winter.

In northern gardens planting of Leeks for winter and spring use should be completed as soon as possible on ground which has received a generous supply of manure. When growth is completed bulbs of Shallots should be lifted and, if possible, should be laid out in trays under a light, airy shelter where they can ripen thoroughly. Tie Tomato plants to their stakes as the growths lengthen, assiduously remove the side shoots as soon as they appear and ultimately take out the leader when the fourth truss of fruits has formed.

Maincrop Potatos should be sprayed about the second week of the month with Burgundy or Bordeaux mixture, to prevent attacks of Potato blight. If necessary, a further spraying should be given later in the month.

Summer prune all Apples and Pears grown as cordons, espaliers, and dwarf bush by shortening all the new laterals back to the fourth or fifth leaf. The leading or extending growth of each branch is not shortened. The object of this pruning is to keep the tree in shape, to permit light and air to penetrate to the fruits, and to assist the development of the fruit buds. The operation must be spread over a period to avoid checking the tree too severely. Commence by summer pruning the Pears by shortening the most vigorous shoots, gradually doing the weaker ones. This will take about ten days, when the Apples will be ready for similar treatment. All secondary growths are

removed as soon as they appear; if these growths are allowed to develop they will largely prevent the formation of the fruit buds.

Apples and Pears will have completed the 'June' drop and the final thinning may be carried out. Start thinning the early varieties first, as these will soon begin to ripen. A good distance to space dessert varieties is five or six inches apart, but the large culinary kinds are given eight to nine inches apart. Use scissors for thinning, removing first the diseased, maggoty, and malformed fruits. If possible avoid leaving fruits in pairs. All thinnings should be burned or buried deeply in the soil. Trees planted during the past winter must not be allowed to carry fruit.

As soon as the last of the fruits have been gathered from the Strawberry plot, clean the bed by removing the litter and weeds. All dead foliage and runners are cut off the plants and the soil between the rows shallowly forked over. Burn all rubbish. Where it is intended to propagate fresh stocks of Strawberries the runners are retained on the strongest and healthiest of the plants. No more than five runners are taken from one parent so as to ensure strong young plants. Layering can either be done by pegging the young plantlets into three-inch pots filled with a good compost, the pots being plunged in the soil, or by pegging down into the ground around the parent plant. Keep the layers well watered and remove all extension runners from the young plants as they appear.

Under glass the Muscat Grapes will be beginning to colour, and care must be taken that there is no shortage of moisture at the roots. If some old hot-bed material is available this can be applied as a light mulch. Muscats require plenty of sun and it is a good plan to tie back any foliage which is shading the bunches. Regulate and tie down all new growths on young rods planted during the past winter.

The early Peach house will now be clear of fruits and the trees should be pruned by removing the old wood which is replaced with this season's shoots. After pruning spray the trees thoroughly with an insecticidal wash.

FEATURES OF MY GARDEN.—IV.**NYMANS.**

By Lieut.-Colonel L. C. R. MESSEL, O.B.E.

UNDER the title 'A Garden Flora,' a book was published in 1918 by Country Life which gave a list of plants then growing in the garden at Nymans, with some notes on successes and failures. Since the time of the publication of this work many new plants have been tried here, and each year an attempt has been made to keep the list up to date by adding the names of plants introduced during the year and also noting those which, for one reason or another, we have lost or discarded. The list is now a record of great interest to us, showing, as it does, the results of fifty years' work in our garden.

My father came to live at Nymans in 1890. The garden was then small but there were several interesting groups of shrubs and some fine trees. Among these are a large *Araucaria araucana (imbricata)*, now over 65 feet high, which usually bears staminate flowers but has been known to bear viable seeds, a *Cedrus atlantica* which is still well furnished down to the ground in spite of its hundred years, and a fair specimen of *Picea Morinda (Smithiana)* 70 feet high, showing well the drooping character of its branches.

Two large groups of deciduous Rhododendrons (Azaleas), now about 100 years old, contain many kinds distributed at that time but not often seen in gardens to-day. Among these are some very late pink and white forms of *R. viscosum*. The centre of one group is composed of some old Magnolias, including a plant of *M. cordata*, an early importation planted at the same time as the Rhododendrons.

Beyond the lawn at the end of the garden is a pergola built of rough sandstone pillars two feet square and connected by larch timbers. This carries a profusion of *Wistaria*, Roses and Clematis. Sometimes the racemes of *Wistaria multijuga* are more than a yard long and hang from the roof of the pergola, while the Roses and Clematis have climbed up into trees which are bright in May and June with cascades of flowers.

The Heather garden is only a few steps from the end of the pergola. I do not know if this is actually the first Heather garden laid out in England but I think it may be. In any case the example has been widely followed. My father greatly admired Heaths, and the idea for this garden came to him from visits to the small Heath beds near King William's Temple at Kew. He tried to grow here as many species and varieties as possible. The result is some flowers at most times of the year.

Other plants are mingled among the Heaths, and *Rosa altaica*,

R. lucida var. *nitida*, *Enkianthus campanulatus*, various species of *Berberis*, some *Rhododendrons* and notably *Pieris japonica* are happy.

The wide interest in shrubs, which has continued and increased up to the present day, was beginning about the time when my father was making the garden, and in this neighbourhood the pioneers were Mr. WILLIAM ROBINSON of Gravetye and Sir EDMUND LODER of Leonardslee. My father was keenly interested in the absorbing work of these two kind neighbours and deeply valued their advice and example. He also wished to test for himself the possibility of growing half-hardy and tender shrubs. With this object in view he built shrub houses in which to grow and harden half-hardy plants before putting them out into the open. To this care of young plants during their early life and to covering them in severe weather after they had been planted out of doors some of his successes may be attributed. Although for various reasons we do not protect plants in winter as much as was formerly done here, I have no doubt that many half-hardy plants can be helped by this means and their life considerably prolonged.

To carry on with his experiments in the open my father partially enclosed an old paddock near the house with a nine-foot wall. This paddock he had previously planted with orchard trees, some of which still remain. Here many *Eucryphias* and *Hydrangeas* find a home.

Gardening friends usually select the late spring or early summer for their visits, and during the last few years the garden has been open to the public—most frequently in May and June. The plants which flower at that time are therefore well known and there seems to be little reason to write of them. I have latterly tried to arrange that the last open day should coincide as nearly as possible with the time when the *Eucryphias* and *Hydrangeas* are opening their flowers.

All through the late summer and early autumn *Hydrangeas* brighten the garden, and in some seasons one may enjoy flowers of the different *Eucryphias* for a very long time. In 1939 one plant of *E. lucida* which had opened its first flower in June still bore some perfect flowers when the December frost came. As it grows here *E. lucida* is fastigate, small leaved and very free flowering. The fact that it continues so long in flower offers opportunities for hybridization, and we have raised several hybrid seedlings which are growing freely, but as yet none has flowered.

E. Milliganii is a charming miniature now some 6 feet high, and for the last few years has been covered with flowers.

E. glutinosa grows freely in our loam. It has reached a height of some 24 feet and spreads about 26 feet. I think this is one of the best shrubs ever introduced, not only because of the magnificence of its masses of white flowers which open towards the end of July but also on account of the restrained beauty of its autumn colour. The bursting of the flowers is a fresh incentive to the hive bees for which the plant seems to have great powers of attraction, although the comparatively small amount of honey obtainable, even from thousands of blossoms, makes little difference, I understand, to the "honey flow" which by this time

is generally over. It may be worth mentioning that H. F. COMBER, the Andean collector, says that the honey gathered from *E. cordifolia* in the Andes had an excellent flavour. The unintentional pollination of the flowers of *E. glutinosa* and *E. cordifolia* occasioned by the industry of the bees brought us a great gain in the shape of the hybrid *E. nymansensis*. This hybrid is said to be hardier than either of its parents, and is certainly hardier than *E. cordifolia*.

There are several forms in existence. Seedlings were distributed to various gardens and there propagated, but we have now found that one form is decidedly better than the others. The leaf is a deeper green and the flower has more substance. The original plant of this form is near the Heath Garden and is now 25 feet high.

Seeds of both *E. glutinosa* and *E. cordifolia* were sown in 1914 and the hybrid appeared among those sowings. As a young plant *E. nymansensis* grows very fast, sometimes 3 feet in one year, but when it reaches 15 to 18 feet in height its growth becomes slower.

E. cordifolia is represented here by a specimen 36 feet high and 23 feet wide. There are two plants of *E. cordifolia* planted near two plants of *E. glutinosa* and the flowering period of the two species sometimes overlaps, as it did in 1939, although *E. cordifolia* opens its flowers some weeks later than *E. glutinosa*. A few years ago in a very mild season I noted a few flowers still to be seen on *E. cordifolia* until after the turn of the year, and flowers sometimes persist until very late in the autumn on the hybrid. Seeds set freely on both species and on the hybrid but do not ripen until fifteen months after formation. In this district the leading shoot of *E. cordifolia* is often killed by frost, and this accounts for the bushy examples so often seen. Our largest specimen was always protected each winter until it was about 15 feet high.

We raised a number of seedlings of *E. cordifolia* from seeds brought over from the Andes by H. F. COMBER. These are planted in a large group in the Rhododendron Wood. Their tips were rather badly frosted in the winter 1938-9.

E. Moorei grows and has flowered well in a sheltered place. It was only slightly injured by the severe frost of 1938-9, but we await with some trepidation the result of the early 1940 weather.

In the upper garden a large group of *E. glutinosa* seedlings has shown double and semi-double forms; but the position is rather dry and the plants have not grown as freely as elsewhere.

Ornamental also are the Hydrangeas, which not only grow freely in our light loamy ironstone soil but are thereby induced to change their ordinary pink and reds to splendid blues, lilacs and purples according to the variety.

Hydrangeas give so much beauty to the garden in late summer and autumn that some mention of the various species and varieties which here succeed best may be of interest.

Hydrangea arborescens is not particularly attractive but is interesting for the fact that it was one of the American plants introduced by

PETER COLLINSON in 1736. He writes: "My Hydrangea—perhaps the first in England—flowered in August, 1746, in my garden at Mill Hill."

A much better garden plant is *H. arborescens* var. *grandiflora*. It grows to a height of four to five feet. Practically all the flowers are sterile, the heads being so heavy that they cause the branches to droop and need support.

Another curious species is *H. involucrata*. This plant is five feet high here and flowers from August until October. Before the flowers open they are enclosed in a whorl of bracts, white shaded with pink. These persist at the base of the corymb during the flowering period. It is a native of Japan.

H. paniculata is lighter and more graceful than its variety *H. paniculata* var. *grandiflora*. It is said to reach a height of 25 feet in its native Japan but shows no inclination to do so at Nymans. *H. paniculata* var. *grandiflora* is a very fine shrub. The large white sterile flowers need support. It is much used as a bedding plant in the London parks.

H. petiolaris climbs over a doorway in a garden wall and drapes the circular top of the arch very prettily. In another part of the wall garden it was trained on the wall, but has now climbed into an old Apple tree, where it charmingly shows off its creamy white flowers.

H. vestita is a huge shrub which is perhaps not worthy of the good position given it.

Of *H. aspera* we have only one example, a thin plant in a shady place. Perhaps in a better position it might show its bluish purple flowers to greater advantage.

There are many forms of *H. villosa*. The one we have is slightly tender, and young plants in vigorous growth are sometimes severely injured. Older plants, pruned lightly if at all, have come through winters uninjured, and flowering so late in the season are a most welcome addition to our garden. WILSON introduced this plant from Western Szechwan in 1908-9.

H. quercifolia has never grown really well here. It is an interesting plant blooming in summer and sometimes gives good autumn colour.

Another Hydrangea which loves slight shade is *H. Sargentiana*. Here it grows to some 9 feet in height and throws up suckers. The beautiful large leaves are thickly covered with small hairs which give them the appearance of dark green velvet. The sparse sterile flowers vary from bluish white to blue and the fertile flowers lilac to blue. Its bristly stems and handsome foliage make it unique among hydrangeas.

The great mass of colour is usually due to *H. opuloides* and its varieties, including vars. *Mariesii*, *Mariesii lilacina*, *nigra*, etc. The garden varieties of *H. opuloides* are many, as can be seen in groups at the Chelsea and other shows. They vary considerably in hardiness and assume widely differing tints of blue when the roots reach down to our subsoil. *H. opuloides* var. *Mariesii* attains a height of over 6 feet and a

width of the same dimension. It flowers very generously. A distinct variety purchased under the name of *H. opuloides* var. *Mariesii lilacina* is more serrated in leaves and flowers than the type.

H. serrata rosalba, often listed as *H. Lindleyi*, forms a bushy plant with dull green leaves. The sterile flowers open bluish white but gradually change to pink, and later, in some cases, to a brilliant red. It appears to be rather hardier than *H. opuloides* and is a very beautiful plant.

Several other species, such as *H. scandens* which clings fast to a wall, grow here as well as other varieties, but do not call for comment.

Perhaps I should mention a few specimens or groups of other trees and shrubs. Magnolias are much appreciated in this garden, and there is a group of *M. stellata* 15 feet in height, 72 feet in length and 14 feet in width, which is a fine sight when in flower. There is also a plant of the pink variety.

M. Sargentiana, although 35 feet high and planted in 1911, has only flowered twice, the first time in 1932. It bears a few flower-buds at the time of writing.

Our big plant of *M. Campbellii* flowers occasionally, and its hybrids very freely. Both grow well, the hybrid particularly fast.

The older plants of *M. officinalis*, which for years we listed and distributed to many friends as *M. hypoleuca*, have always flowered freely, and the scent is often strong fifty yards away from the tree.

M. Lennei, *M. denudata* and *M. rustica rubra* are large bushes or small trees, covered with flowers in their season.

Other Magnolias also grow well with us ; among them *M. parviflora*, *M. sinensis*, *M. Delavayi*, *M. Wilsonii*, *M. Watsonii*, *M. Kobus*, *M. salicifolia*, *M. acuminata*, *M. Dawsoniana* and *M. tripetala*.

A very different plant but one of great merit is *Osmanthus Delavayi*, which is very happy in this garden. The flowers are deliciously scented, and this is particularly noticeable after a warm shower. Also the drooping branchlets flower in great profusion. Our two largest plants are 10 feet high and 14 feet wide and have produced seeds from which plants have been raised.

Kolkwitzia amabilis also grows well and has flowered heavily for many years. *Cornus controversa* is a plant well worth growing by those who love beautiful form in trees. Its branches are in tiers, covered in season with the upright corymbs of flowers.

Another *Cornus* which attracts much attention is *C. Kousa*. The frost of 1928-9 split off some of the bark from the stem, but in spite of the lessened food supply the plant is still beautiful, although the leaves show brighter autumn colour than they did before the injury occurred. We have raised from cuttings a group of three of this *Cornus* which has made a fine show in the upper garden in the last few years.

The *Nothofagus* genus is also represented here. *N. fusca* is now common enough in English gardens but was a rarity when my father imported a plant from New Zealand. It is now 58 feet high. Specimens of *N. cliffortioides*, *N. Solandri*, *N. Menziesii* are flourishing.

N. betuloides and *N. Dombeyi* planted later are doing well, the latter having grown particularly fast. Of *N. pumilio* we have only one specimen raised from seeds of H. F. COMBER's introduction.

Planted in an open place in woodland a group of H. F. COMBER'S alpine form of *N. antarctica* shows good colour in the autumn. *N. obliqua* and *N. procera* have been planted in a wood as forest trees. These we also raised from seeds brought home by H. F. COMBER.

An interesting tree in the upper garden is *Meliosma Veitchiorum*, one of WILSON's introduction. I remember a magnificent specimen of this at Kew, but believe that few seedlings were raised from WILSON'S seeds. Our tree has often produced seeds, but these have never proved fertile.

Near the garden is a piece of land which, having been entirely neglected for many years by its then owner, had gone back to the wild. At the north end of this a self-sown wood of Scots Pine had grown up, and here we have planted many species of Rhododendron, collected since 1924 by FORREST, KINGDON WARD and ROCK. We have also planted hybrids of our own raising and hybrids given us by friends who have raised them. A little to the south of this wood is a rough field which had grown up into a tangle of Furze, Brambles and Birch. Most of this has been cut in order to find places for plants for which the garden had no space. Here have been planted many seedling Magnolias, groups of Berberis and of those Rhododendrons which love more light than they can have if planted in the wood.

A plantation of *Photinia villosa* gives autumn colour, and a large group of *Rosa Moyesii* is good both in flower and fruit.

A group of the two lanceolate forms of *Embothrium* flanked by a healthy plant of the Chinese form of *Cornus Kousa* form a background to a plantation of *Euonymus phellomanus*. Then a little farther on, a bank of *Cotoneaster conspicua* skirts a group of taller Cotoneasters. Reference has been made to the erect form of *C. conspicua* growing at Nymans. Actually our form is not erect and the height is only attained by the flat or dependent branches building up on one another—if at ground level they would lie flat. This clump of Cononeasters faces west, and, when the afternoon sun shines on it, the broad effect of scarlet is striking.

Passing through the "Rough Field" by a grass path, we come to a broad straight walk which runs the full length of what has now become the nursery. At one time we grew many Rhododendron seedlings here, and there are still a good many young plants of very diverse kinds on trial. On the whole, however, this ground is now occupied by more permanent plants and also by many Lilies. On the other side of the walk is a Birch wood, the front of which has been planted with dwarf Rhododendrons.

A great delight to us in recent years has been the work of collecting together as many of the old Roses and Rose species as possible. Some grow in different parts of the garden and nursery, but the main collection is in a small garden where it is easy to see and enjoy them. Those who

grow Roses still have much to look forward to when the great display of spring-flowering trees and shrubs comes to an end, and for them the months of June and July are as full of reward as any in the year. It is true that some of the Rose species are at their best earlier in the year; but it is to June and July that we must look forward for the great show of flower. On the whole, Roses, both species and hybrids, have done well here, and the addition of so many of them to our list has added greatly to the pleasure of many friends. Nor must the beauty which many of them show when in fruit be forgotten, and, in some cases, the plant, when making a brilliant display of its hips, is as striking as it was when in full bloom. Roses have come here from many parts of the world—from the eastern and western regions of the United States, from China, Japan and Siberia, from Tibet and the Himalayas, from many parts of South Europe and even from Persia—while native Roses of these islands have not been omitted. The Scottish Rose, *R. spinosissima*, is represented by many varieties. Many of the old Roses have been gifts from gardens in England, Scotland, Ireland, Italy and France, and I particularly call to mind one bright crimson China Rose which was secured from cuttings from a plant growing behind the stem of an ancient Wistaria in this neighbourhood. The late Mr. E. A. BUNYARD identified this as the true *Rosa indica* var. *semperflorens*. I remember also his pleasure when he noticed a Rose which has been growing on the gardener's cottage for many years. It was certainly an old plant fifty years ago. He had been trying to find a specimen of this Rose for a long time, but, although he had often passed this plant, had somehow not noticed it before. It turned out to be one of the earliest Noisette Roses, and this particular one is illustrated by REDOUTÉ in his great work 'Les Roses.'

One of the most beautiful of the single Roses is 'Lady Curzon,' raised in Messrs. TURNER'S nursery by GEORGE LILLEY, at that time their foreman. He gives *Rosa rugosa* var. *rubra* as the seed parent, but there is doubt as to the identity of the other parent.

R. macrantha and *R. Dupontii* (*R. nivea* of REDOUTÉ) are also beautiful plants, and some of the Moschata Roses are very lovely, particularly a semi-double variety which has climbed right over an Apple tree. Another variety of *R. moschata* has covered an Oak some 35 feet high and will in time kill it, but it makes a splendid show each June. A plant of *R. longicuspis* has also reached very nearly to the top of a 40 foot high Deodar, and very fine it looks when in flower, but the Deodar will suffer. There is a brick path in the kitchen garden with Roses on each side of it and Roses arched on trellises over it. This was here fifty years ago, and although renewals have had to be made from time to time, many of the old hybrid perpetuals which were raised in the 'sixties, and of which several have the exquisite true Rose scent, still grow there.

Only a few words more. In the preface to the 'Garden Flora,' my sister, after expressing her gratitude to those who had given her such generous help in the arrangement of the list, adds: "And James

Comber, who planted the trees and shrubs and has cared for them through more than twenty summers and winters, has supplied points of interest which otherwise would have remained unknown."

This was written in 1917. JAMES COMBER has loved and tended the trees and shrubs ever since. Can I say more?

ORPHANIDESIA GAULTHERIOIDES.

By FRED STOKER, F.L.S., V.M.H.

ORPHANIDESIA is a monotypic genus belonging to the family *Ericaceae* and is represented by *O. gaultherioides*. According to EDMOND BOISSIER,¹ the species was discovered in fruit by BALANSA in a *Rhododendron ponticum* association on the road between Andon and Djimil (Lazistan Pontus, Turkey-in-Asia) in the year 1866. E. K. BALLS, while on a collecting expedition, rediscovered the plant in much the same neighbourhood (Kalapotomas Dere, Rize) in August 1934, but did not see the flower. In a personal communication he described the shrub as common at an altitude of 3,000 to 4,000 feet in a restricted area (he found it in only one valley and on the hills above it), as growing in association with *Rhododendron ponticum*, *R. luteum* and *Vaccinium Arctostaphylos* and as making dense mats from 6 to 12 inches thick and measuring "yards across" in, generally, half-shade.

The original diagnosis of *Orphanidesia gaultherioides* was made by BOISSIER,¹ but neither it nor KUSNEZOW's² account is entirely satisfying; the description of the inflorescence by these authors is of that kind which, though recognizable by those who already know the plant, gives only a vague idea to the unversed. BALANSA, presumably, only saw the plant in fruit and BOISSIER admits his unfamiliarity with the flower in these words¹ ". . . the corolla seems to be 6-7 lines long; I have not seen it myself but my friend Prof. DECAISNE sent me a sketch-in-outline (*adumbrationem*) of a dried corolla he had found among the leaves of a specimen." BOISSIER's limited acquaintance with the flower, however, did not prevent him from stating that the anthers in *Orphanidesia* opened by apical pores, nor from making that unfounded character a generic distinction between *Orphanidesia* and *Epigaea*. In fact, the anthers in both dehisce by longitudinal slits.³

Two published figures of *Orphanidesia gaultherioides* are cited by the *Index Londinensis*, one in *Gartenflora*⁴ and the other in two contributions by G. DIECK.⁵ As all three are identical, only one (Fig. 55) is reproduced here. It is misleading, particularly in the inflorescence. The sepals and bracteoles, for example, are too prominently shown. In all the fresh flowers I have seen they are hidden by the open corolla.

The following description is taken from plants raised from seed (B. 1941) collected by BALLS in Lazistan:—

Orphanidesia gaultherioides. An evergreen, prostrate shrub increasing in height by the superimposition of its branches which, according to BALLS (*vids*

EXTRACTS FROM THE PROCEEDINGS OF THE ROYAL HORTICULTURAL SOCIETY.

GENERAL MEETINGS.

APRIL 16, 1940.

SCIENTIFIC COMMITTEE.—Mr. E. A. BOWLES, M.A., F.L.S., F.R.E.S., V.M.H., in the Chair, and eight other members present.

Gnaurs on Forsythia.—Mr. Green reported that he had this phenomenon under investigation but had so far been unable to connect any parasite with its occurrence.

Gnaurs on Cryptomeria japonica.—Dr. Tincker showed some gnaurs from the stem of *Cryptomeria japonica*, one of them about 6 inches long and 2½ inches wide at the circular base, making a horn-like projecting growth, different in form from the ovate one often seen in *Cedrus* (which he also showed) and in the fact that in *Cedrus* the growth appears to be developed from one bud—in *Cryptomeria* several appear to be involved.

Beetles in hoof and horn.—Mr. G. Fox Wilson showed a specimen of hoof and horn manure containing numerous examples of the spider-like beetle, *Niptus holosericeus*, a species often found in stored grain and other stored products.

Papyrus from Cyperus.—Mr. F. G. Preston showed two specimens of papyrus made from home-grown *Cyperus Papyrus* by him, one white from young stems, the other drab from older ones. The material was made by cutting thin slices of the stems, laying them vertically side by side, and, after moistening the surface, placing another layer horizontally across these and then another vertical layer, the whole being placed in a press. The material was exactly similar to that anciently made in Egypt and was untearable.

Abnormal growth of Lily bulb.—Mr. Cotton showed a one-year-old bulb of *Lilium regale* which had been laid on its side on fibre in a shed through the winter and had produced a shoot from the base. He took it for further examination.

Orchid from Italy.—Lt.-Col. Messel sent a plant of an Orchid collected by him in Italy allied to *Orchis mascula* which agreed with the description and figure in Camus's *Orchideae* (t. 38) of the mauve form, there called *O. obiensis*.

Double virescent Narcissus cyclamineus.—Mr. Bowles showed a curious form of *Narcissus cyclamineus* which Mr. Wall had noticed at Wisley and which had persisted for the past three or four years. He took it for further examination.

Aerial bulb of Tulip.—Messrs. Miln sent a Tulip showing a well-developed bulb on the aerial stem, a not uncommon occurrence, usually arising after injury to the basal part.

Flowers and Insects.—Mr. C. H. Hooper sent a long list of observations he had made of insect visitors to garden flowers. He classified them as follow :

Bumble-bee Flowers: Red Clover, Larkspur, Monkshood, Columbine, Tropaeolum, Antirrhinum, Horse Chestnut, Foxglove, Broad Bean, Scarlet Runner, Honeysuckle, Gladiolus, Apple, Pear, Plum, Cherry.

Hive-bee Flowers: White Clover, Lime, Raspberry, Golden Rod, Aster, Hollyhock, Arabis, *Linnanthes Douglasii*, *Lilium candidum* and 500 other common plants, including all ordinary fruits.

Butterfly Flowers: Pinks, Phlox, Buddleia, Sweet William, Loosestrife, Scabious, Thistle, Ivy, Teasel, White and Red Clover, Lucerne.

Moth Flowers: Mullein, Clover, Lucerne, Bramble, Knapweed.

Hawk-moth Flowers: Honeysuckle, Nicotiana, *Lilium candidum*, *Silene noctiflora*, *Oenothera Lamarckiana*, Petunia, Rhododendron (?), Jasmine.

Fly Flowers: Saxifrage, Buttercups, Anemone, Arabis, Myosotis, Strawberry, Ivy, Arum, Caltha.

Beetle Flowers: Rose, Apple, Asparagus, Poppy, St. John's Wort. (Beetles nearly all destructive of flowers.)

APRIL 24, 1940.

AT BIRMINGHAM.

JOINT NARCISSUS COMMITTEE.—Mr. E. A. BOWLES, F.L.S., F.R.E.S., V.M.H., in the Chair, and seven other members present.

Award Recommended :—

Preliminary Commendation.

To *Narcissus 'Saltash'* (voting unanimous). Raised by the late Mr. P. D. Williams and shown by Major C. B. Habershon, Hesterworth, Aston-on-Clun.

Selected for Trial.

Narcissus 'Marion Cran.' shown by Messrs. J. R. Pearson & Sons, Ltd., Lowdham, selected for trial at Kirton as a variety for cutting from the open for market.

Narcissus 'Orange Bird.' shown by Messrs. Barr & Sons, 13 King Street, Covent Garden, London, W.C. 2, selected for trial at Wisley as a variety for garden decoration.

Other Exhibits.

Narcissus 'Jill.' shown by Messrs. Barr & Sons.

Narcissus 'Poland' and *N. 'Orange Splendour.'* shown by Messrs. H. Prins, Ltd., Wisbech.

APRIL 30, 1940.

A lecture was given by Mr. W. F. GILES, on "A Continuous Supply of Vegetables from Summer Sowings." Chairman, Mr. F. A. SECRETTE, F.L.S., V.M.H.

SCIENTIFIC COMMITTEE.—Mr. E. A. BOWLES, M.A., F.L.S., F.R.E.S., V.M.H., in the Chair, and six other members present.

Abnormal growth of Lily bulb.—Mr. Cotton reported that Mr. C. R. Metcalfe of Kew, who examined the bulb shown at the last meeting, found that "the shoot which has grown out from the base appears to have arisen from a bud in the axil of one of the scale leaves. The main shoot is abortive. It looks rather as if a hole had been made in the base of the bulb by some mechanical injury through which the axillary shoot had subsequently grown out. It may have grown in a basal direction because the mechanical resistance was less, or because the shoot, being positively heliotropic, grew towards the light entering the hole."

Double virescent Narcissus cyclamineus.—Mr. Bowles reported that he had examined the flower from Wisley and found the coronal portions completely abortive. Six superimposed ranks of perianth segments surrounded a central crateriform cavity in which, apparently arising from the top of the almost completely aborted ovary, was a tuft of petaloid growths springing from a common stalk. The structure was similar to that seen in *N. systettensis*.

Weevil-eaten Pea plants.—Mr. Preston showed Pea plants scalloped along the leaf margins by the beetle *Sitones lineatus*. The best preventive of this damage is dusting with Derris powder.

Various growths on Colletia.—Mr. Robinson showed a plant of *Colletia cruciata*, which had been cut back and grown under glass, producing spiky, thorn-like shoots and leafy growths as well as later the flattened thorns that are characteristic of the species.

Lloydia graeca.—Miss Mackenzie of Fawley Court, Henley-on-Thames, sent plants of *Lloydia graeca* in flower; each plant (about 4 inches high) produced two or three white, green-veined, trumpet-shaped flowers about $\frac{1}{2}$ inch long at the top of a slender stem bearing very narrow linear leaves with a tuft of wider leaves at the base. The plant was collected in Cyprus.

FRUIT AND VEGETABLE COMMITTEE.—Mr. F. A. SECRETTE, V.M.H., in the Chair, and ten other members present.

Exhibit.

Apples: 'Annie Elizabeth,' 'Beauty of Kent,' 'Bramley's Seedling,' 'Lane's Prince Albert,' 'Newton Wonder,' 'Norfolk Beefing,' 'Sandringham' and 'Sturmer Pippin.' Strawberry: 'Royal Sovereign.' Pear: 'Basiner.' Asparagus: Cabbage, 'Harbinger.' Carrot, 'Early Forcing': Cucumber, 'Ideal': Lettuce, 'Commodore Nutt': Radish, 'Scarlet Globe': Morel (*Morchella esculenta*). Mushroom. Shown by Lady Leconfield, Petworth Park, Petworth, Sussex.

FLORAL COMMITTEE A.—Mr. G. W. LEAK, V.M.H., in the Chair, and fourteen other members present.

Awards Recommended :—

Silver Flora Medal.

To Messrs. Allwood Bros., Haywards Heath, for an exhibit of Carnations.

Silver Banksian Medal.

To Mr. G. H. Dalrymple, Bartley, for an exhibit of Auriculas.

To Mr. J. Douglas, Great Bookham, for an exhibit of Auriculas.

To Messrs. C. Engelmann, Ltd., Saffron Walden, for an exhibit of Carnations and Pansies.

Flora Medal.

To Mr. F. J. Bell, Whitley Bay, for an exhibit of Violas.

To Mr. E. Ladham, Elstead, for an exhibit of *Trollius*, *Polyanthus*, etc.

Banksian Medal.

To Messrs. Blackmore & Langdon, Bath, for an exhibit of *Polyanthus* and Blue Primroses.

To The Stuart Low Co., Enfield, for an exhibit of Carnations.

To Messrs. Toogood & Sons, Ltd., Southampton, for an exhibit of *Schizanthus*.

Other Exhibit.

Polyanthus, shown by Messrs. Toogood & Sons, Ltd., Southampton.

FLORAL COMMITTEE B.—Lord ABERCONWAY, C.B.E., V.M.H., in the Chair, and twenty other members present.

Awards Recommended :—

Silver-gilt Flora Medal.

To Knap Hill Nursery, Ltd., Woking, for an exhibit of Rhododendrons.

Silver-gilt Banksian Medal.

To Messrs. J. Cheal & Son, Ltd., Crawley, for an exhibit of flowering trees and shrubs.

To Messrs. Hillier & Son, Ltd., Winchester, for an exhibit of flowering trees and shrubs.

To Messrs. G. Jackman & Son, Woking, for an exhibit of Clematis.

To Mr. W. J. Marchant, Wimborne, for an exhibit of flowering shrubs.

To Messrs. L. R. Russell, Ltd., Windlesham, Surrey, for an exhibit of flowering trees and shrubs.

To Messrs. W. C. Slocock, Ltd., Woking, for an exhibit of Rhododendrons.

Silver Banksian Medal.

To Messrs. W. E. Th. Ingwersen, Ltd., East Grinstead, for an exhibit of rock garden plants.

To The Stuart Low Co., Enfield, for an exhibit of Camellias.

To Messrs. G. Reuthe, Ltd., Keston, Kent, for an exhibit of flowering shrubs.

Flora Medal.

To Messrs. C. Elliott, Ltd., Stevenage, Herts, for an exhibit of rock garden plants.

To Mr. A. Hansen, New Barnet, for an exhibit of rock garden plants.

To Messrs. M. Prichard & Sons, Ltd., Christchurch, for an exhibit of rock garden plants.

To Messrs. Robinson, Eltham, Kent, for an exhibit of rock garden plants.

Banksian Medal.

To Messrs. Cheal, for an exhibit of rock garden plants.

To Mr. K. W. Harle, Lower Basildon, for an exhibit of succulents.

To Marsden Nursery, Ashtead, for an exhibit of hardy flowering plants.

To Messrs. J. Peed & Son, West Norwood, for an exhibit of Callas.

To Messrs. Toogood, Southampton, for an exhibit of rock garden plants.

Award of Merit.

To *Malus 'Simcoe'* as a hardy, ornamental flowering tree (votes unanimous), from Iris Lady Lawrence, Dorking. See p. 220.

Other Exhibits.

Paeonia coriacea, shown by G. P. Baker, Esq., Sevenoaks.

Clinanthus puniceus var. *roseus*, *Grevillea acanthifolia*, shown by Lt.-Col. E. H. W. Bolitho, D.S.O., Penzance.

Flowering shrubs, shown by Messrs. Burkwood & Skipwith, Ltd., Kingston-on-Thames, Surrey.

Rock garden plants, shown by Mr. A. Corderoy, Eltham; Edrom Nurseries, Coldingham; Mrs. K. Hopkinson, Coulsdon.

- Chaenomeles japonica* × *cathayensis*, shown by C. Ingram, Esq., Benenden.
Anemone nemorosa, shown by W. P. King, Esq., Watford.
Malus × *Hartwigii*, shown by Mr. W. J. Marchant, Wimborne.
Berberis × *lologensis*, shown by Lt.-Col. L. C. R. Messel, O.B.E., Handcross.
Varieties of *Caltha palustris*, shown by Messrs. Prichard, Christchurch.
Cassiope fastigiata, shown by L. de Rothschild, Esq., Exbury.
Malus micromalus, shown by the Director, R.H.S. Gardens, Wisley.
Succulent plants, shown by Mr. J. Southgate, West Ewell, Surrey.

ORCHID COMMITTEE.—Sir JEREMIAH COLMAN, Bart., in the Chair, and nine other members present.

Awards Recommended :

Silver-gilt Banksian Medal.

To Messrs. Charlesworth & Co., Haywards Heath, Sussex.

Silver Banksian Medal.

To Messrs. Stuart Low & Co., Jarvis Brook, Sussex.

Award of Merit.

To *Eulophia Rueppellii* (votes unanimous), shown by The Director, Royal Botanic Gardens, Kew. See p. 220.

To *Odontoglossum* × 'Phantasy,' East Burnham var. ('Sidley' × 'Minotaur') (votes unanimous), shown by H. Barnard-Hankey, Esq., East Burnham Park, Bucks. See p. 221.

Cultural Commendation.

To The Director, Royal Botanic Gardens, Kew, for *Catleya Mossiae*, bearing thirty-six fully-expanded flowers.

To Mr. B. White, Orchid grower to H. Barnard-Hankey, Esq., East Burnham Park, Bucks, for *Megaclinium purpureo-rachis*.

NARCISSUS AND TULIP COMMITTEE.—Mr. E. A. BOWLES, F.L.S., F.R.E.S., V.M.H., in the Chair, and ten other members present.

Awards Recommended :

Silver-gilt Flora Medal.

To Messrs. J. R. Pearson & Sons, Ltd., Lowdham, for an exhibit of Daffodils.

To Mr. Guy L. Wilson, Broughshane, Co. Antrim, for an exhibit of Daffodils.

Silver-gilt Banksian Medal.

To Messrs. Barr & Sons, 13 King Street, Covent Garden, London, W.C. 2, for an exhibit of Daffodils and Tulips.

Silver Flora Medal.

To Messrs. R. H. Bath, Ltd., Wisbech, for an exhibit of Daffodils.

To W. B. Cranfield, Esq., F.L.S., V.M.H., Enfield Chase, Middlesex, for an exhibit of Daffodils.

Silver Banksian Medal.

To Messrs. R. Prins, Ltd., Wisbech, for an exhibit of Daffodils.

Flora Medal.

To Messrs. Dobbie & Co., Ltd., Edinburgh, for an exhibit of Daffodils.

Banksian Medal.

To Messrs. Kelway & Son, Langport, for an exhibit of Daffodils and Tulips.

First Class Certificate.

To *Narcissus 'Samite'* as a variety for exhibition (votes 6 for, 0 against). Shown by Mr. Guy L. Wilson, Broughshane, Co. Antrim. This white Trumpet variety (Division 1b) received an Award of Merit as a variety for exhibition on May 2, 1939. (See JOURNAL R.H.S., 64, pp. lxxxvii and 331.)

To *Narcissus 'Sincerity'* as a variety for exhibition (votes 6 for, 0 against). Shown by Mr. Guy L. Wilson. This bicolour Trumpet variety (Division 1c) received an Award of Merit as a variety for exhibition on April 12, 1938. (See JOURNAL R.H.S., 63, pp. lxxxi and 294.)

Award of Merit.

To *Narcissus 'Grey Lady'* as a variety for exhibition (votes 8 for, 0 against). Shown by Mr. Guy L. Wilson. See p. 221.

Narcissus 'Carbineer', after trial at Kirton, as a variety for cutting from the open for market and as a variety for garden decoration. (April 27, 1940.) Sent by Mr. J. L. Richardson, Prospect House, Waterford. This Incomparabilis variety (Division 2a) received an Award of Merit as a variety for exhibition on April 14, 1931 (see JOURNAL R.H.S., 57, p. xliv), and a First Class Certificate as a variety for exhibition on April 5, 1938 (see JOURNAL R.H.S., 63, pp. lxxvii and 293).

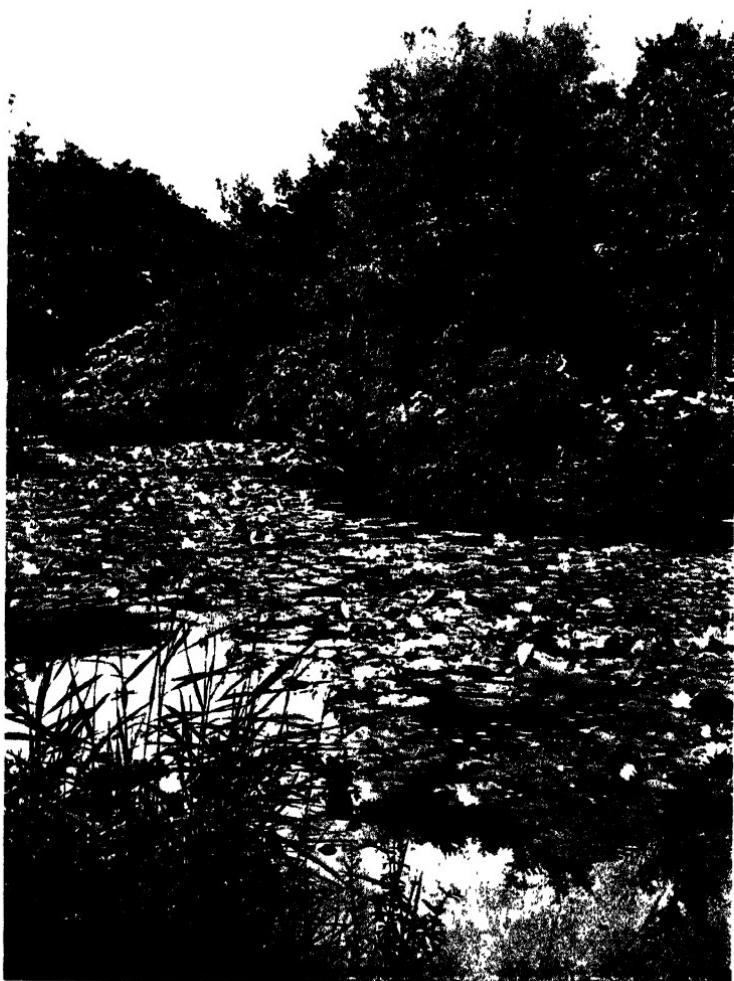


FIG. 54.—WATER LILIES AT WISLEY IN JULY.
(See p. 200.)

[To face p. liv]

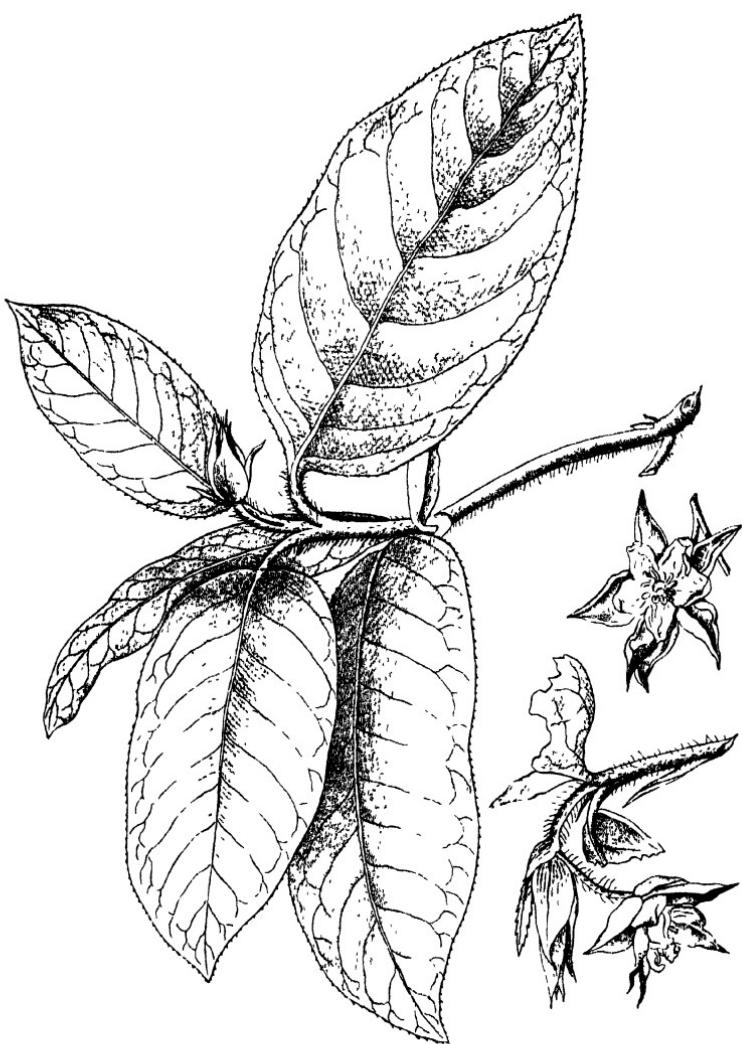


FIG. 55.—*ORPHANIDESIA GAULTHERIOIDES*,
Reproduced from *Gartenflora*, 40, 469
(See p. 210.)



FIG. 56.—*ORPHANIDESIA GAULTHERIOIDES* ($\times \frac{1}{2}$) IN DR STOKER'S GARDEN.
(See p. 211.)

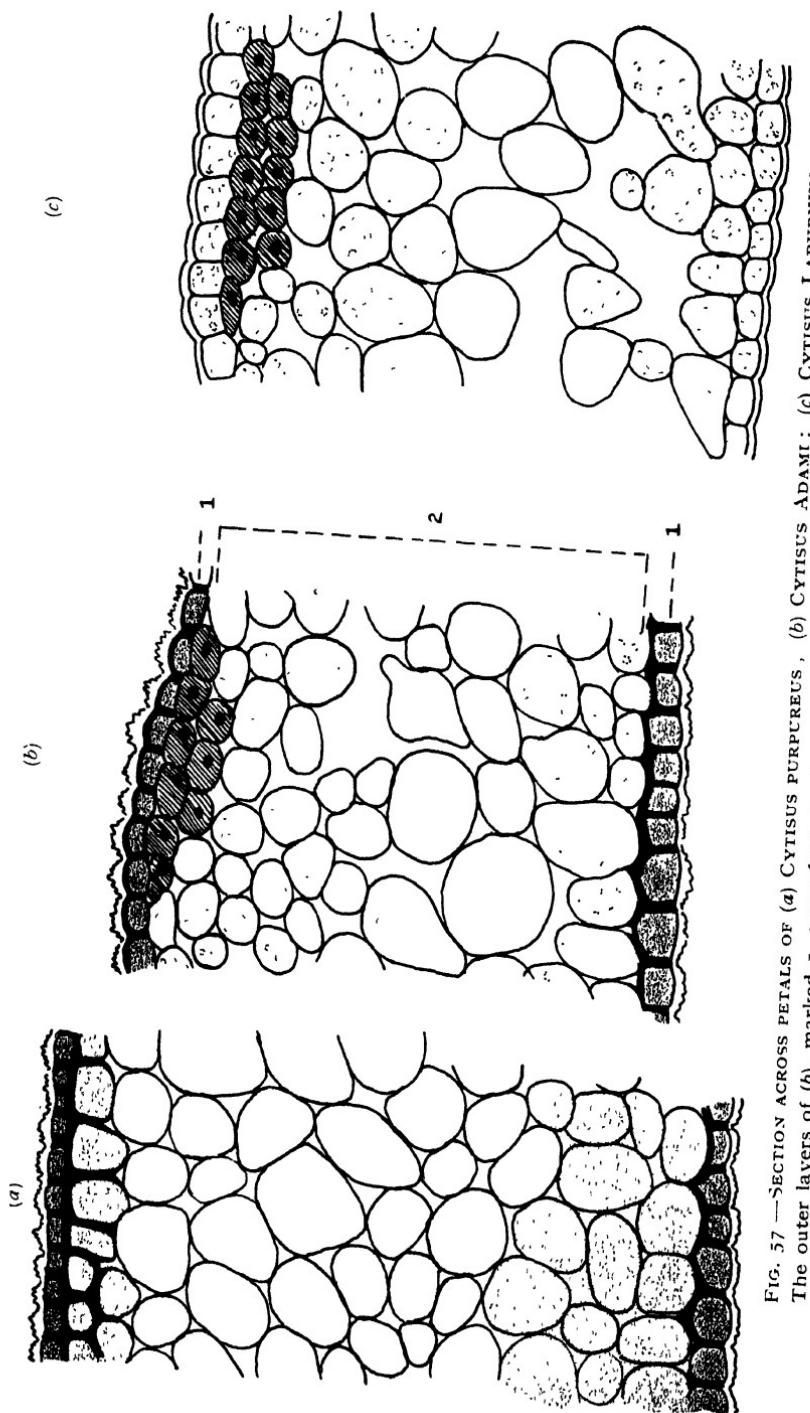


FIG. 57.—SECTION ACROSS PETALS OF (a) CYTISUS PURPUREUS, (b) CYTISUS ADAMI; (c) CYTISUS LABURNUM.
The outer layers of (b), marked 1, come from *purpureus*, the inner layers, marked 2, come from *Laburnum*.
(See p. 213.)

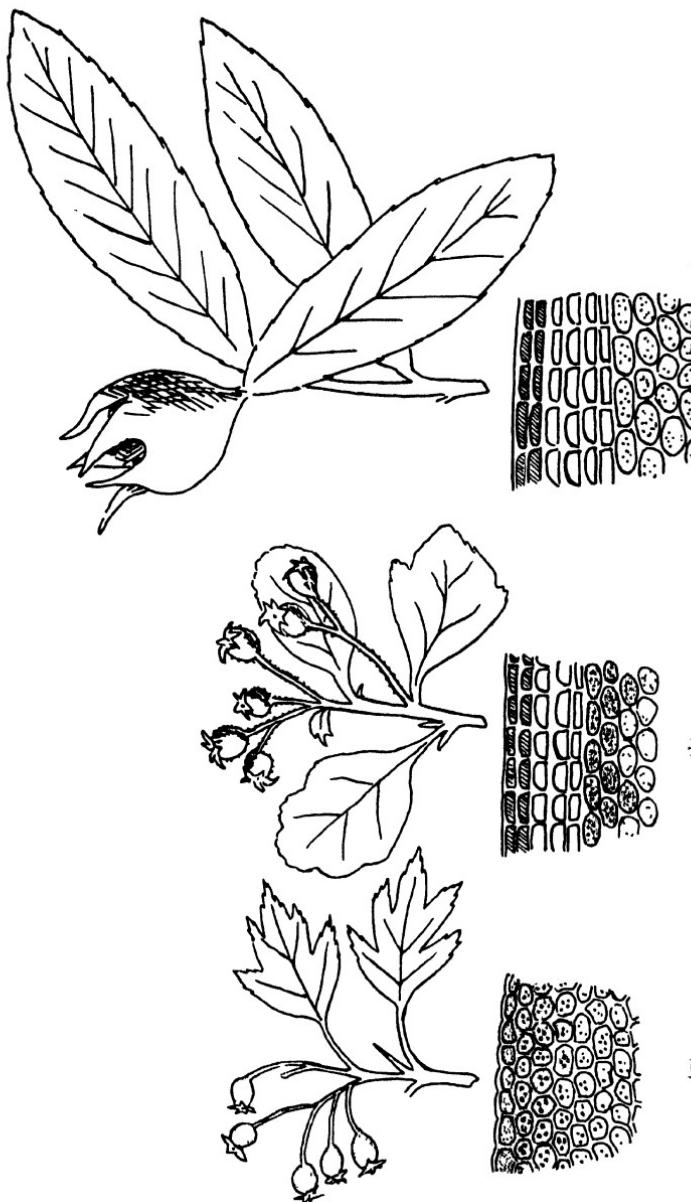


FIG. 58.—FRUITING BRANCHES OF (a) HAWTHORN (CRATAEGUS), (b) GRAFT HYBRID (CRATAEGO-MESPILUS ASNERSII);
(c) MEDLAR (MESPILUS).

Below—sections of the corresponding fruits.
(See p. 214.)

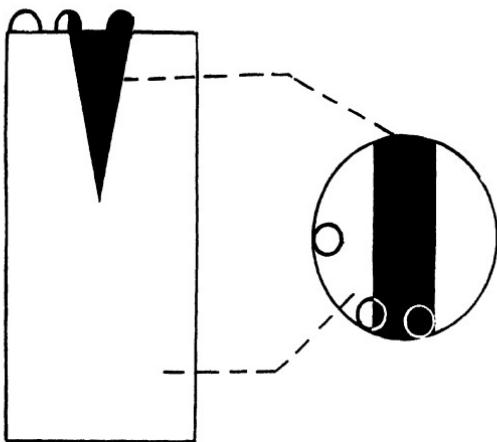


FIG. 50. DIAGRAM ILLUSTRATING LONGITUDINAL SECTION OF GRAFTED STEM AND PLAN OF SURFACE EXPOSED BY TRANSVERSE CUT SCION IN BLACK, STOCK WHITE.

The composition of the buds springing from the cut surface is indicated by the knobs and the circles, the central one becoming a chimaera.

(See p. 215.)

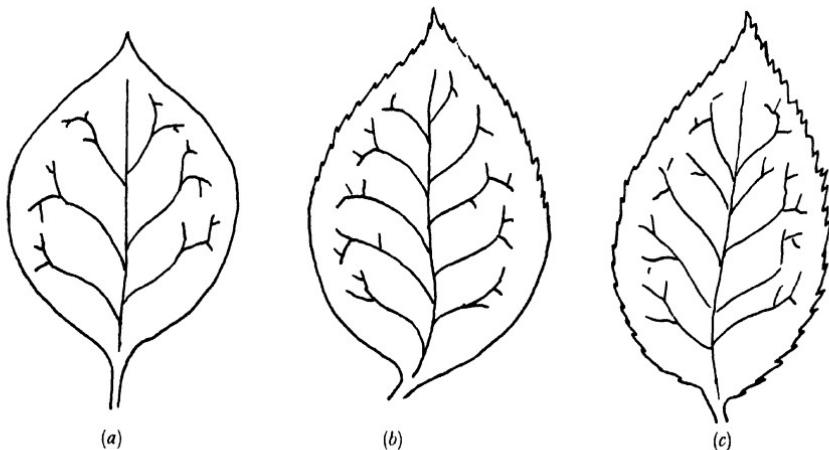


FIG. 60.—LEAVES OF (a) QUINCE WITH SMOOTH EDGE; (b) GRAFT-HYBRID PEAR-QUINCE; (c) PEAR WITH SERRATED EDGE.

The graft-hybrid leaf is serrated above, smooth below.

(See p. 215.)

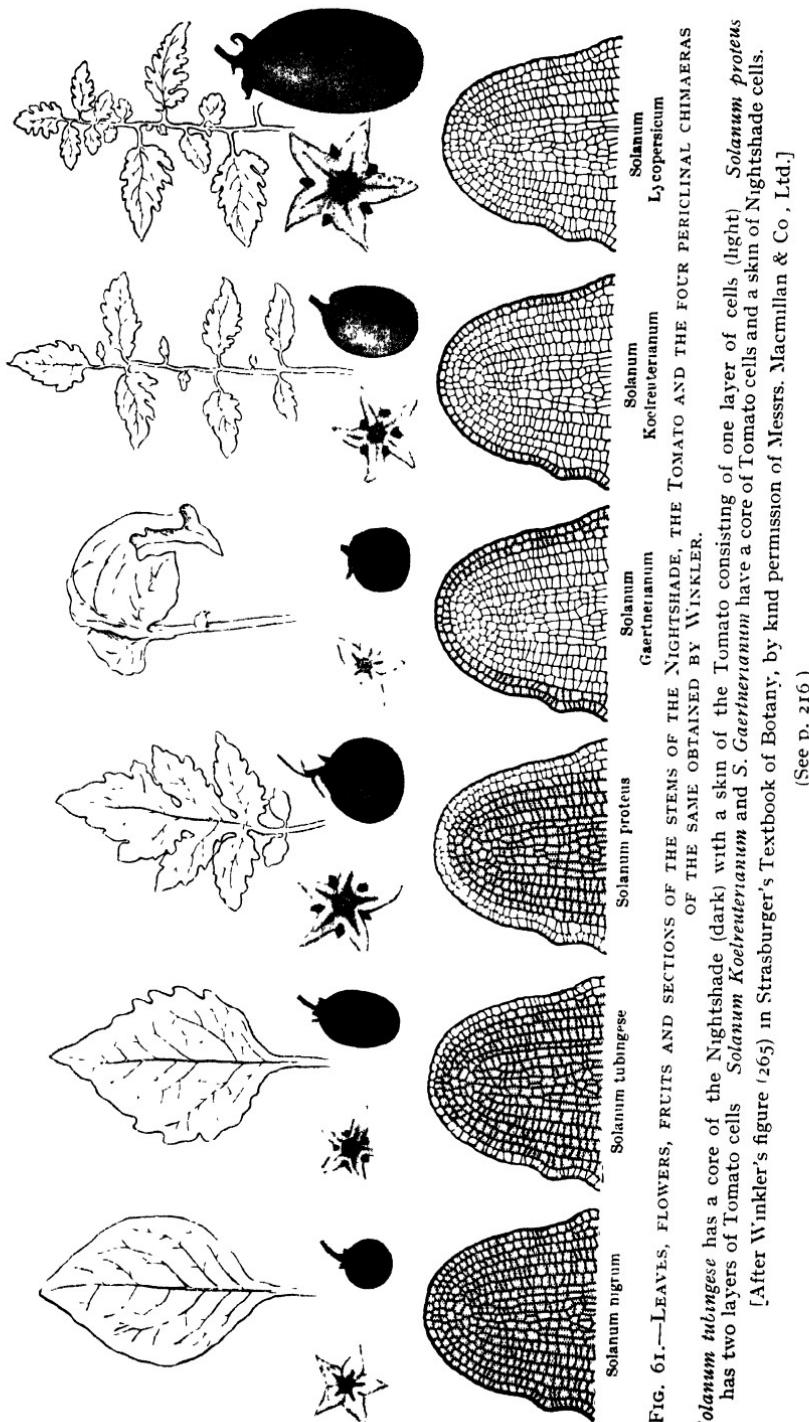


FIG. 61.—LEAVES, FLOWERS, FRUITS AND SECTIONS OF THE STEMS OF THE NIGHTSHADE, THE TOMATO AND THE FOUR PERICLINAL CHIMAERAS OF THE SAME OBTAINED BY WINKLER.

Solanum tuberosum has a core of the Nightshade (dark) with a skin of the Tomato consisting of one layer of cells (light). *Solanum proteus* has two layers of Tomato cells. *Solanum Koelerianum* and *S. Gaertnerianum* have a core of Tomato cells and a skin of Nightshade cells.
[After Winkler's figure (265) in Strasburger's Textbook of Botany, by kind permission of Messrs. Macmillan & Co., Ltd.]

(See p. 216.)

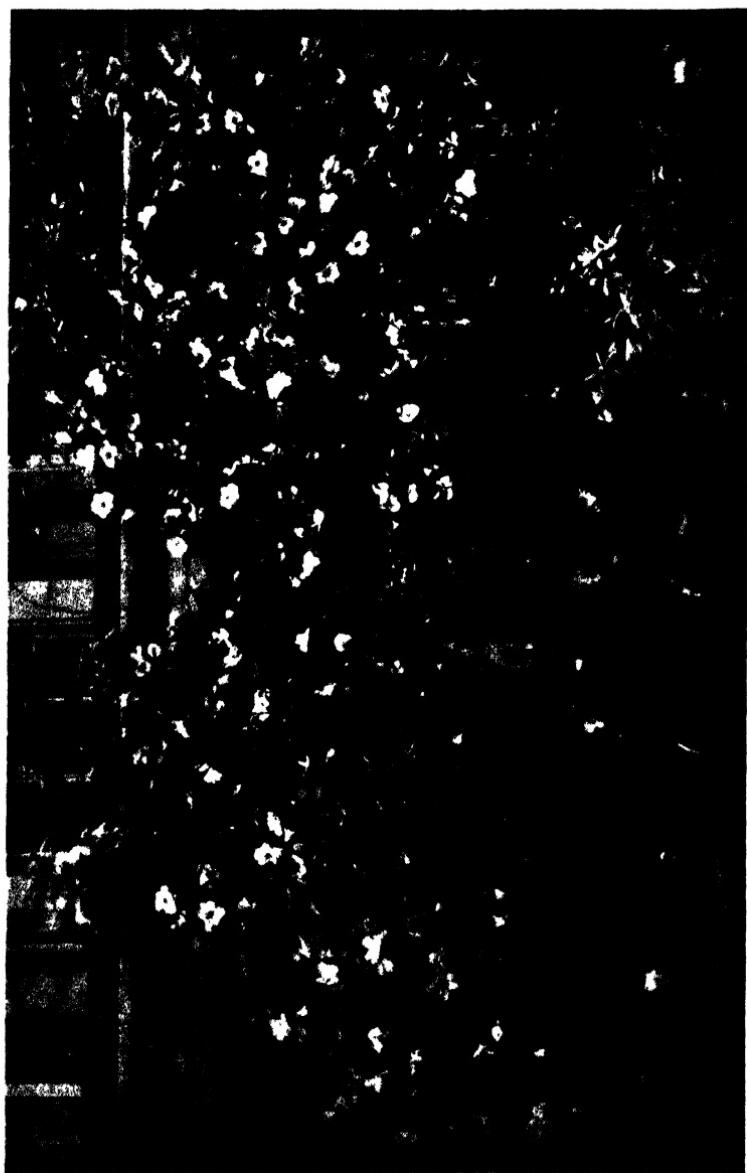


FIG. 61.—*CAMELLIA SALUENENSIS* × *C. JAPONICA*.

(See p. 217.)

[To face p. iv.]

Preliminary Commendation.

To *Narcissus 'Chinese White'* (votes 6 for, 0 against). Shown by Mr. Guy L. Wilson.

To *Narcissus 'Swansdown'* (votes unanimous). Shown by Mr. Guy L. Wilson.

Other Exhibits.

Daffodils, shown by Messrs. Wakeley Bros., Bankside, S.E. 1.

Narcissus 'Cherie,' N. 'Smyrna,' N. 'Bravura' and N. 'Silver Wedding.' shown by Mr. Guy L. Wilson.

Tulipa scardica, shown by Mrs. H. P. Thompson, High Pine Close, Weybridge.

JOINT RHODODENDRON COMMITTEE.—Mr. J. B. STEVENSON, V.M.H., in the Chair, and sixteen other members present.

Awards Recommended :—*Award of Merit.*

To *Rhododendron × 'Electra'* (*R. chasmanthum* × *R. Augustinii*) (votes unanimous), as a hardy flowering plant for the woodland garden. Shown by Lionel de Rothschild, Esq., Exbury, Southampton. See p. 222.

To *Rhododendron gymnocarpum* (votes 11 for, 2 against), as a hardy flowering plant for the woodland garden. Shown by Lionel de Rothschild, Esq. See p. 222.

To *Rhododendron × 'Day Dream'* (*R. × 'Lady Bessborough'* × *R. Griersonianum*) (votes 13 for, 0 against), as a hardy flowering plant for the woodland garden. Shown by Lionel de Rothschild, Esq. See p. 222.

To *Rhododendron × 'Biskra'* (*R. cinnabarinum* var. *Roylei* × *R. ambiguum*) (votes 11 for, 2 against), as a hardy flowering plant for the woodland garden. Shown by Lionel de Rothschild, Esq. See p. 221.

To *Rhododendron × 'Cretonne'* (*R. Barclayi* × *R. Loderi*) (votes 10 for, 4 against), as a hardy flowering plant for the woodland garden. Shown by Sir Giles Loder, Leonardslee, Horsham. See p. 221.

To *Rhododendron × 'China'* (*R. Wightii* × *R. Fortunei*) (votes unanimous), as a hardy flowering plant for the woodland garden. Shown by Messrs. W. C. Slocock, Ltd., Woking, Surrey. See p. 221.

Other Exhibits.

R. × 'White Knight' (*R. Loderi* × *R. decorum*) (to be seen again), shown by Admiral A. Walker-Heneage-Vivian, Clyne Castle, Swansea.

R. Griersonianum × *R. Kingianum* (to be seen again), from Admiral A. Walker-Heneage-Vivian.

R. × 'Cremorne' (*R. Luscombei* × *R. Williamsianum*) and *R. 'L. R. Number 539'* (*R. litense* × *R. Williamsianum*), shown by Lionel de Rothschild, Esq.

R. × 'Cornish Cream' (*R. × 'Fortorb'* × *R. campylocarpum*), shown by Lt.-Col. E. H. W. Bolitho, Trengwainton, Penzance.

A seedling not for award, shown by Lord Swaythling, Townhill Park, Southampton.

R. × 'Campxen' (*R. campylocarpum* × *R. detonsum*, f. *zenosporum*) ; and *R. × 'Orecinn'* (*R. oreocrepis* × *R. cinnabarinum*) ; *R. peregrinum*, shown by E. J. P. Magor, Esq., Lamellen, St. Tudy, Bodmin.

R. Loderi × *R. × 'Mrs. Messel'*, shown by Admiral A. Walker-Heneage-Vivian.

Azaleodendron 'Helen Vandevere' (*R. Griersonianum* × *R. occidentale*), shown by the Director, R.H.S. Gardens, Wisley (originally from Mr. Edward G. Vandevere, 490 Post Street, San Francisco).

JOINT ROCK-GARDEN PLANT COMMITTEE.—Major F. C. STERN in the Chair, and ten other members present.

The minutes of the previous meeting were confirmed and signed.

Awards Recommended :—*Award of Merit.*

To *Gaylussacia brachycera* (votes unanimous) as a flowering shrub for the rock garden, from Mr. W. J. Marchant, Keeper's Hill Nursery, Stapehill, Wimborne. See p. 220.

Preliminary Commendation.

To *Androsace* sp. Ludlow and Sheriff 3575 (votes unanimous) as a hardy flowering plant for the rock garden and alpine house, from J. E. H. Roberts, Esq., 19 Cavendish Square, W. 1.

To *Androsace Wardii* (votes unanimous) as a hardy flowering plant for the rock garden and alpine house, from J. E. H. Roberts, Esq.

Other Exhibits.

Primula 'Zenobia,' shown by Mrs. Gwendolyn Anley, St. George's, Wych Hill Lane, Woking.

Polemonium pulcherrimum, shown by T. Hay, Esq., C.V.O., V.M.H., New Lodge, Hyde Park, W. 2.

Sempervivum 'Climax,' shown by A. Hansen, Esq., Park Road, New Barnet, Herts.

Primula szechuanica var. *advena*, and *Primula hyacinthina* (G. Sheriff 2294), shown by Colonel S. R. Clarke, C.B., Borde Hill, Haywards Heath, Sussex.

Primula Edgeworthii, shown by Messrs. Edrom Nurseries, Coldingham, Berwickshire.

JOINT IRIS COMMITTEE.—No meeting took place as there were no exhibits to place before the Committee.

MAY 21, 1940.

SEWELL MEDAL COMPETITIONS.

The Amateur's Medal for the best three pots or pans of alpines was awarded to G. P. Baker, Esq., V.M.H., Sevenoaks.

A lecture was given by Mr. G. Fox WILSON, F.L.S., F.R.E.S., N.D.H., on "Some Seasonal Pests of Garden Vegetables and their Control." Chairman, Mr. J. C. F. FRYER, O.B.E., M.A., F.R.E.S.

SCIENTIFIC COMMITTEE.—Mr. E. A. BOWLES, M.A., F.L.S., F.R.E.S., V.M.H., in the Chair, and three other members present.

Fasciated Holly.—Mr. John Grimes of Cardiff sent a photograph of a fasciated holly shoot with the flattened part of the stem about $2\frac{1}{2}$ in. wide.

Paeonies.—Mr. W. B. Cranfield sent a number of Paeonies for naming, including *P. trollioides*, which Major Stern, who is preparing a monograph on the genus, now places as a variety of *P. Potaninii* (*P. Potaninii* var. *trollioides*) ; some yellow-flowered seedling forms very near *P. lutea* raised from seed from Glasnevin, perhaps with a little *P. Delavayi* in their ancestry (Major Stern regards *P. lutea* and *P. Delavayi* as the extremes of a series of intergrading forms), the flowers carried more above the foliage than in *P. lutea*; *P. lutea* itself with more slender growth; *P. lutea* \times *P. Delavayi* with flowers tinged brown.

Orange attacked by scale.—Shoots of Orange affected by the scale insect, *Lecanium hesperidum*, were sent from a garden in Nottingham.

FRUIT AND VEGETABLE COMMITTEE.—Mr. F. A. SECRETT, V.M.H., in the Chair, and eleven other members present.

Exhibits.

Asparagus 'Mary Washington,' shown by Mr. F. A. Secrett, Bell Farm, Felcote Road, Walton-on-Thames.

Asparagus 'Connover's Colossal' and '*Harwood's Giant,*' shown by R.H.S. Commercial Fruit Trials, Wisley.

FLORAL COMMITTEE A.—Mr. D. INGAMELLS in the Chair, and fourteen other members present.

Awards Recommended :—

Silver-gilt Banksian Medal.

To Messrs. Blackmore & Langdon, Bath, for an exhibit of Begonias and Delphiniums.

Silver Flora Medal.

To Messrs. Allwood Bros., Haywards Heath, for an exhibit of Carnations.

Silver Banksian Medal.

To Messrs. C. Engelmann Ltd., Saffron Walden, for an exhibit of Carnations and Gerberas.

To Mr. E. Ladham, Elstead Nurseries, Godalming, for an exhibit of herbageous plants, shrubs and Roses.

Flora Medal.

To Mr. J. Douglas, Great Bookham, for an exhibit of Border Carnations.

Banksian Medal.

To The Stuart Low Co., Enfield, for an exhibit of Carnations.

To The Orpington Nurseries Co. Ltd., Orpington, for an exhibit of Irises.

To Messrs. Maurice Prichard & Sons, Ltd., Christchurch, for an exhibit of herbaceous plants.

Award of Merit.

To *Antirrhinum 'Lothrop's Double Pink'* as a variety for market (votes 13 for, 0 against), from Messrs. C. Engelmann Ltd. See p. 219.

To *Begonia 'Bertha Balmer'* as a greenhouse flowering plant (votes 12 for, 0 against), from Messrs. Blackmore & Langdon. See p. 219.

To *Begonia 'Délice'* as a greenhouse flowering plant (votes 13 for, 0 against), from Messrs. Blackmore & Langdon. See p. 219.

Selected for trial at Wisley.

Centaurea montana 'Elstead Purple,' from Mr. E. Ladhams.

Other Exhibits.

Roses, shown by Messrs. Ben R. Cant & Sons, Ltd., Colchester.

Myosotis 'Dolly Thorne,' shown by Mr. A. Corderoy, Eltham.

Pyrethrum 'May Day,' shown by Mr. W. Spencer, Witney.

Irises, shown by Windward Violet Farm, Dawlish.

FLORAL COMMITTEE B.—Lord ABERCONWAY, C.B.E., V.M.H., in the Chair, and nineteen other members present.

Awards Recommended :—

Silver-gilt Flora Medal.

To Knap Hill Nursery, Ltd., Woking, for an exhibit of Azaleas.

Silver Flora Medal.

To Messrs. Hillier & Sons, Ltd., Winchester, for an exhibit of flowering shrubs.

To The Stuart Low Co., Enfield, for an exhibit of tender flowering shrubs.

Silver Banksian Medal.

To Messrs. J. Cheal & Son, Ltd., Crawley, for an exhibit of flowering trees and shrubs.

To Messrs. W. A. Constable, Ltd., Southborough, Kent, for an exhibit of Lilies.

To Messrs. Robinson, Eltham, Kent, for an exhibit of rock garden plants.

Flora Medal.

To Messrs. Maxwell & Beale, Ltd., Broadstone, Dorset, for an exhibit of rock garden plants.

To Messrs. G. Reuthe, Ltd., Keston, Kent, for an exhibit of flowering shrubs.

To Messrs. L. R. Russell, Ltd., Windlesham, Surrey, for an exhibit of Azaleas.

Banksian Medal.

To Mr. K. W. Harle, Lower Basildon, Berks, for an exhibit of succulents.

To Messrs. M. Prichard & Sons, Christchurch, for an exhibit of rock garden plants.

To Messrs. Toogood, Southampton, for an exhibit of rock garden plants.

Award of Merit.

To *Malus ioensis plena* as a hardy flowering tree (votes unanimous), from Iris Lady Lawrence, Riverdale, Dorking. See p. 220.

To *Meconopsis superba* as a hardy flowering plant (votes 14 for, 0 against), from Lord Aberconway, C.B.E., V.M.H., Bodnant. See p. 220.

To *Rhododendron × 'Fabia'* var. 'Tangerine' as a hardy flowering shrub (votes 16 for, 0 against), from Lord Aberconway, C.B.E., V.M.H., Bodnant. See p. 222.

Cultural Commendation.

To S. G. Fiedler, Esq., Rose Hill, Claygate, Surrey, for a specimen plant of *Euphorbia horrida*.

Other Exhibits.

Flowering shrubs, shown by Messrs. Burkwood & Skipwith, Ltd., Kingston.

Rock garden plants, shown by Mr. A. Corderoy, Eltham, S.E. 9, Mrs. K. Hopkinson, Coulsdon, Surrey, and The Marsden Nursery, Ashtead, Surrey.

Paeonia lutea × Delavayi, *P. lutea*, *P. trolloides*, shown by W. B. Cranfield, Esq., Enfield.

Echeveria elegans, *Gasteria Baileyi*, shown by S. G. Fiedler, Esq., Claygate.

Chenopodium capitatum, shown by Mrs. E. B. Wood, Ashtead, Surrey.

Rhododendron villosum, shown by E. J. P. Magor, Esq., Lamellen, St. Tudy, Bodmin, Cornwall.

Rhododendron Magorianum, shown by E. J. P. Magor, Esq.

lviii PROCEEDINGS OF THE ROYAL HORTICULTURAL SOCIETY.

ORCHID COMMITTEE.—Sir JEREMIAH COLMAN, Bart., in the Chair, and nine other members present.

Awards Recommended :—

Silver Banksian Medal.

To Messrs. Sanders (St. Albans) Ltd., St. Albans, for a group of Orchids.
To The Stuart Low Co., Jarvis Brook, for a group of Orchids.

Award of Merit.

To *Cymbidium* × 'Joyful' (C. 'Joy Sander' var. *magnificum* ♀ × C. 'Ceres' var. 'F. J. Hanbury' ♂) (votes unanimous), from Messrs. J. & A. McBean, Cooksbridge, Sussex. See p. 220.

Other Exhibit.

Cymbidium × 'Delphine' var. 'Alison,' from N. M. Jensen, Esq., Dukes Edge, Woldingham, Surrey.

NARCISSUS AND TULIP COMMITTEE.—Mr. E. A. BOWLES, F.L.S., F.R.E.S., V.M.H., in the Chair, and seven other members present.

Awards Recommended :—

Gold Medal.

To Messrs. Barr & Sons, 13 King Street, Covent Garden, London, W.C. 2, for an exhibit of Tulips (votes 6 for, 0 against).

Silver-gilt Banksian Medal.

To Messrs. R. H. Bath, Ltd., Wisbech, for an exhibit of Tulips.

Banksian Medal.

To Messrs. Wakeley Brothers & Co., Ltd., 74 Bankside, London, S.E. 1, for an exhibit of Tulips.

Other Exhibit.

A seedling Tulip sent by F. Morris, Esq., Nutfield Priory, Redhill, Surrey.

JOINT RHODODENDRON COMMITTEE.—The Committee failed to form a quorum and three exhibits submitted for inspection were referred to the Floral Committee B.

JOINT ROCK-GARDEN PLANT COMMITTEE.—Major F. C. STERN in the Chair, and eleven other members present.

Awards Recommended :—

Award of Merit.

To *Campanula oreadum* (votes 8 for, 0 against), as a hardy perennial plant for the rock crevice, scree or alpine house. Shown by H. Clifford Crook, Esq., 4 Alexandra Crescent, Bromley, Kent. See p. 220.

To *Aquilegia scopulorum* (votes unanimous), as a hardy plant for the rock garden. Shown by Charles T. Musgrave, Esq., Olivers, Hascombe, Godalming, Surrey. See p. 219.

Preliminary Commendation.

To *Thalictrum psilotifolium* (votes unanimous), as a hardy plant for the rock garden. Shown by S. G. Fiedler, Esq., Rose Hill, Claygate, Surrey.

Other Exhibit.

Bryanthus musciformis, from S. G. Fiedler, Esq. The Committee desired to see this plant when in flower at a future meeting.

JOINT IRIS COMMITTEE.—Major F. C. STERN in the Chair, and eight other members present.

Exhibit.

Iris lactea (Pallas), shown by Miss Cecilia Christie-Miller, Henley-on-Thames.

MAY 31, 1940.

AT WISLEY.

JOINT IRIS COMMITTEE.—Mr. R. W. WALLACE, V.M.H., in the Chair, and six other members present.

Selected for trial at Wisley.

Iris seedlings P.2 and Nos. 24 and 27, shown by W. B. Cranfield, Esq., F.L.S., East Lodge, Enfield Chase, Middlesex.

supra), are capable of considerable spread. *Branches* rounded; old wood scaly and bristly; new wood thickly clothed with stout, red, glandular hairs. *Leaves* alternate; *petiole* of an average length of 1 cm., glandular-bristly, narrowly channelled above; *leaf-blade* from 5 to 9 cm. long, 2 to 4·5 cm. wide, rough to the touch, oval to elliptic-oblong, shortly and bluntly mucronate, slightly wavy at edge; upper surface dark dullish green, reticulate, more or less bristly especially towards edge which itself is bristly; lower surface paler, slightly reticulate, bristly on and near veins. *Inflorescence* racemose; racemes from terminal leaf-axils, elongated, rather zigzag, 1·9 to 3·8 cm. long, axis glandular-setose and carrying from one to three flowers. *Flowers* sessile, each in the axil of a sessile, setose, inwardly concave, semi-membranous, lanceolate-acuminate *bract* which widens at the base and is, on an average, 1 cm. long by 4 mm. broad at its widest part. *Calyx* persistent, supported by two opposite, inwardly concave, smooth (except for a few bristles on the midrib), glandular, pale green, membranous bracteoles 1·4 cm. long by 5·5 mm. wide which overlap at their bases; *segments* five, closely applied to corolla, elliptical-acuminate, 1·5 cm. long by 5 mm. wide, overlapping at base, smooth, membranous, pale green often touched with rose at tips and near one or both edges, the rose fading to white at the edge itself. *Corolla* gamopetalous, shaped like a cup with sloping sides and scalloped edge, shell-pink with slightly darker veins, 2·5 cm. long, 3·4 cm. across mouth, outer surface smooth, inner downy except for the lobes which, five in number, compose almost the whole of the distal half of the corolla and are somewhat rugose, more erect than spreading, conical and have their blunt tips folded inwards. *Stamens* ten; *anthers* pale yellow, 4 mm. long, dehiscing by longitudinal slits; *pollen* pale yellow; *filaments* 1·8 cm. long, pink, gradually narrowing towards anthers, thickly clothed with stiffish horizontal hairs for lower third. *Pistil* prominent; *stigma* 5-lobed, capitate, 2 mm. across; *style* slightly curved, 2·2 cm. long, smooth; *ovary* flattened-globose, smooth, faintly 5-lobed, 4 mm. in diameter. *Fruit* not seen.

The distribution of *Orphanidesia gaultherioides* appears to be confined to that area of mountainous country a little inland from the south-eastern corner of the Black Sea. Thus, in addition to the stations given by BOISSIER and by BALLS, which already have been quoted, KUSNEZOW⁵ gives Lazistan and KESSELRING⁶ the district of Artwin (south-western Transcaucasia). All the authorities cited mention the association of the plant with other *Ericaceae*, particularly Rhododendrons.

Orphanidesia has its closest generic affinity in *Epigaea* and from that it may be readily distinguished by (1) its elongated, few-flowered racemes (in *Epigaea* the flowers are in crowded, terminal clusters) and (2) the shape of the corolla (in *Epigaea* it is of the cylindrical-tube-cum-spreading-limb pattern).

O. gaultherioides is no more difficult to cultivate than *Epigaea asiatica* and responds to similar treatment. The photographed plant is growing in lime-free, porous soil under considerable shade and the ground is mulched with Pine needles. The foliage is striking and the flowers, which open in April, are very lovely (fig. 56).

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MASTERS MEMORIAL LECTURES, 1940.

GRAFT HYBRIDS AND CHIMAERAS.—I.

By PROFESSOR F. E. WEISS, D.Sc., LL.D., F.R.S., F.L.S.

[Sir A. D. HALL, K.C.B., LL.D., F.R.S., V.M.H., in the Chair.]

THE term hybrid, as all horticulturists know, is given to a plant which has arisen by the crossing of two different varieties, species, or, indeed, in some cases genera. Such hybrids are formed by the union of two microscopic cells of the two plants, a pollen grain from the stamen of one plant and an egg cell contained in the ovary of the other parent. As this act of fertilization results in the formation of a seed, we may call the hybrid which originates in this way a seed hybrid, whereas a graft hybrid was supposed to have arisen from the fusion of two cells of dissimilar plants which had been grafted one upon the other.

Chimaera was the name given in classical mythology to a fabulous monster, part lion, part goat and part serpent. Botanically the term is used to describe the union or growing together of two dissimilar plants sometimes arising by grafting.

The earliest graft hybrid to be scientifically investigated is the famous Bizzaria Orange, raised in Florence in 1644. This curious plant produced on some of its branches Oranges, on others Lemons, and on some fruits which were partly Orange and partly Lemon, thus forming what we call sectorial chimaeras. As the plant had arisen by grafting an Orange on a Citron Lemon stock, the plant was termed a graft hybrid. An investigation of the history of this plant has shown that the Orange scion, which had been inserted on the Lemon stock, perished and the peculiar Bizzaria plant arose as an adventitious bud at the point where the graft had been inserted. It is probable that some of the tissues of the scion remained in a living condition at the base of the slip and that the adventitious bud was formed from these living cells growing together with those of the stock. The probability of this being the case is strengthened by the fact that another graft hybrid, as we shall see presently, has arisen in just such a way.

More recently a Japanese botanist, Tanaka, has investigated in detail several cases of Bizzaria Oranges, both in Florence and in La Mortola, and has shown that not only the fruits but also the leaves shew considerable variations, some branches having a typical Orange, and others a Lemon foliage. As regards the fruits he finds that in the La Mortola specimen the fruits have normal Citron pulp enclosed in an Orange peel, but the latter is penetrated by bands of citron character which have made their way to the surface. He considers, therefore, that the peculiar fruits are not sectorial chimaeras but are of the nature

of what is termed periclinal chimaeras, in which the core of one plant is covered by the skin of another.

Another graft hybrid, the nature of which has been scientifically examined, is the Laburnum known as *Cytisus Adami*. It originated in 1825 when a French horticulturist, named Adam, of Vitry, near Paris, budded a shield of the slender *Cytisus purpureus* on a stem of a common Laburnum, hoping thus to obtain a weeping specimen of the straggling little alpine plant. The bud of the inserted scion, however, died back, but from the point of insertion a strong shoot developed later. This shoot resembled that of an ordinary Laburnum, but it bore smaller leaves, and when flowers were produced the trusses were shorter than those of the Laburnum and the individual flowers were of a colour intermediate between those of the two parents. Hence it was presumed that a fusion of two vegetative cells of stock and scion had taken place, resulting in what might be termed a graft hybrid. Like the Bizzaria Orange, *C. Adami* not infrequently produces branches which revert to one or other of the parental plants. The branches which take the character of *C. purpureus* are very different from those of *C. Adami*, being thin and delicate and bearing the small leaves of the purple broom.

Professor MACFARLANE, in his comparison of the minute structure of plant hybrids published in 1891, stated that whereas in most seed hybrids such details as the size and shape of the cells were intermediate between the corresponding features of the parents, in *C. Adami* the very striking resemblance which the epidermis of the hybrid portion has to that of *C. purpureus* not only in the general structure of the cells, but in the size and structure of the cell nucleus, the distribution of the stomata and in the nature of the hairs, would seem at first sight to prove that the hybrid portion was *wrapped round*, so to speak, by an epidermis of *C. purpureus*. When some twenty years later it was suggested by BAUR and definitely proved by BUDER that this interesting graft hybrid was really a periclinal chimaera consisting of a core of the ordinary Laburnum surrounded by a skin, one layer of cells in thickness, of the purple broom, MACFARLANE'S observation was definitely established (see fig. 57).

An interesting experimental verification of the periclinal chimaera theory is the fact that by wounding the epidermal cells of a bud of *C. Adami* the central core may come to the surface and a branch is produced which is entirely composed of Laburnum tissues and bears the characteristic large trusses of yellow flowers.

A further confirmation of the periclinal chimaera theory is the fact that when *C. Adami* sets seeds the latter produce pure Laburnum seedlings. This results from the fact that the reproductive cells arise from the inner tissues, usually from the second layer of cells, so that, as in this case, the core of the plant is formed entirely from the Laburnum stock, the pollen grains and egg cells are all of Laburnum nature and so are their offspring.

In England Medias are not cultivated extensively, but on the

Continent the fruits are valued and the Medlar is generally propagated by grafting it on a Hawthorn stock. In a garden at Bronvaux near Metz an old Medlar tree, said to be a hundred years old, produced near the point of union of stock and graft two branches which were seen to have foliage and fruits intermediate in character between those of the Hawthorn and Medlar. They were, therefore, presumed to be graft hybrids. One of the branches had a closer resemblance to the Hawthorn and the other to the Medlar. The former was called *Crataego-mespilus Asniersii*, the other *C. Dardari*. The leaves of *C. Asniersii* are small and either oval or trilobed, but much less deeply lobed than those of the Hawthorn (see fig. 58 b). The flowers are small and borne in clusters like those of the Hawthorn. The leaves and shoots, including the flowering shoots and the receptacle of the flower, are covered with short hairs, a characteristic of the Medlar. The flowers fairly frequently set fruits, which are brown in colour like those of the Medlar and when viable produce ordinary Hawthorn plants.

Crataego-mespilus Dardari, which has a greater resemblance to the Medlar than it has to the Hawthorn, has leaves in shape like those of the Medlar, but smaller in size. They and the branches are tomentose; so are the receptacles of the flowers, of which three are generally borne together in the axil of a leaf rather smaller than those of the Medlar, which bears its flowers singly. Although fruits are occasionally formed, the seeds so far have not proved viable.

As in the case of *Cytisus Adami*, so in the case of *Crataego-mespilus* there has been a good deal of controversy as to whether it is a real graft hybrid, resulting from the fusion of two vegetative cells of stock and scion respectively, or whether it is a periclinal chimæra with the skin of the Medlar covering the central core of the Hawthorn. Detailed investigations pointed sometimes in one direction, sometimes in another. It is now generally accepted that *Crataego-mespilus Asniersii* has a core of Hawthorn tissue covered in by a single layer of cells (epidermis) belonging to the Medlar scion. This accounts for the hairiness of the leaf and also for the brown colour of the fruits, for in the Medlar the epidermal cells of the ripening fruit divide into a brown cork layer (see fig. 58 c). In the fruit of *Crataego-mespilus Asniersii*, below this cork layer, the red cells of the Hawthorn core can be seen when examined under the microscope. The fact that its seeds give rise to pure Hawthorn seedlings also agrees with this interpretation, for, as stated in the similar case of *C. Adami*, the reproductive cells are formed from the layer lying below the epidermis, that is, from cells of the Hawthorn core.

Crataego-mespilus Dardari, which has a greater resemblance to the Medlar, is now generally assumed to have a Hawthorn core, but an enveloping cover of Medlar tissue which must consist of at least two rows of cells. This greater proportion of Medlar tissue causes it to be more like the latter.

Another graft hybrid was first described by Professor DANIEL. It

is a common practice in France, as in England, to graft Pears on a Quince stock. In France, when signs of decrepitude show themselves in the Pear tree it is cut down to the point of the original grafting and one of the adventitious buds which form at the base of the Pear tree is encouraged to grow into a new fruit-bearing branch. On such a cut-down tree three shoots were produced in a garden at Rennes having certain characters which were intermediate between the Pear and the Quince. As will be seen from the accompanying figure (see fig. 60), the leaves of the Quince have a smooth edge, those of the Pear are serrate, while those of the presumptive graft hybrid, which had been called *Pirocydonia Danieli*, show a smooth margin at the base and a serrate margin towards the apex of the leaf. This arrangement does not at first sight seem to fit in with our conception of sectorial or pericinal chimaeras, but in the development of a leaf the base and central portion of the leaf tissue usually contains a larger proportion of the internal core, while towards the margin and the tip of the leaf the external tissues preponderate. The tip of the leaf would, therefore, resemble the Pear more closely than the Quince if we assume that *Pirocydonia* consists of the core of the Quince surrounded by the skin of the Pear.

Though *Pirocydonia*, the Pear-Quince, has been propagated by grafting for twenty years, it has so far not produced any flowers. In this respect it differs from the other graft hybrids, and it may have a different constitution. Professor DANIEL does not consider that it is of the nature of a pericinal chimaera.

While the majority of the investigations on graft hybrids dealt in the first instance with an examination of the structure and behaviour of growths which had arisen fortuitously, WINKLER was the first to attempt to obtain graft hybrids experimentally. He used for his experiments two related species, the black nightshade (*Solanum nigrum*) and the Tomato (*Solanum Lycopersicum*). Choosing two plants of similar thickness of stem, he severed the base from the top by a wedge-shaped cut, inserting the wedge-shaped base of the severed portion into the "V"-shaped gap left in the stock. In this way he obtained two plants, one with the Tomato scion inserted into the nightshade base and the other representing the nightshade scion on the Tomato stock. When the union of stock and scion had taken place, WINKLER cut transversely across the grafted portion, thus exposing a small portion of the scion between two pieces of the stock (see fig. 59). This exposed portion soon became covered with a layer of callus which formed a number of adventitious buds. According to the position in which they arose, they might produce either pure Tomato or nightshade branches, or if they arose near the junction of the two different tissues they grew into sectorial chimaeras bearing Tomato leaves on one side and nightshade leaves on the other. Among these various kinds of shoots WINKLER obtained in 1908 a branch on which the leaves were intermediate in character, being undivided like those of *S. nigrum*, but having the serrate margin and the hairy covering

of the Tomato leaf. This branch WINKLER regarded as a true graft hybrid and named it *Solanum tubingense* (see fig. 61). ERWIN BAUR, however, suggested that it was a periclinal chimaera with a core of the black nightshade covered in by a skin of the Tomato. In the case of these two plants his theory was capable of proof, for the nightshade and the Tomato differ in the number of their chromosomes, the constituent parts of the nucleus, which is present in every cell. In the Tomato they number twenty-four in each vegetative cell, while in the nightshade they number seventy-two. A microscopical examination made it clear that *S. tubingense* was in fact a periclinal chimaera consisting of a core of *S. nigrum* with a skin, one layer in thickness, of *S. Lycopersicum* (see fig. 61). Now since the inner cells were all derived from the nightshade stock, and reproductive cells are internal cells, we should expect the seedlings to be pure nightshade plants, and this is indeed the case. Thus of nearly 1,200 seedlings raised by selfing *S. tubingense* all were pure *S. nigrum*.

In addition to this first chimaera, WINKLER obtained another one on the Tomato stock to which he gave the name of *Solanum proteus* (fig. 61) on account of the variability of the shape of its leaves. This more unstable chimaera has a Tomato skin of two cells in thickness over a core of nightshade cells. From the Tomato stock on which the nightshade had been grafted WINKLER obtained two further chimaeras, one of which had a covering of one layer of nightshade cells over a core of the Tomato and the other two layers of nightshade cells. These have been called respectively *S. Koelreuterianum* and *S. Gaertnerianum* (see fig. 61).

More recently JÖRGENSEN and CRANE (1927), adopting WINKLER's methods, have produced a further series of *Solanum* chimaeras by experimenting with other species of this genus. Working at the John Innes Horticultural Institution they have obtained the following forms, in designating which the first specific name indicates the nature of the core and the second of the skin :

Solanum nigrum var. *gracile*—*sisymbifolium*.

Solanum Lycopersicum—*guineense*.

Solanum Lycopersicum—*luteum*.

Solanum luteum—*Lycopersicum*.

These showed various tendencies to somatic segregation into the parental forms. *Solanum tuberosum*, the Potato, shows more reluctance to the formation of adventitious buds, but, experimenting with this species and the Tomato, JÖRGENSEN was able to produce a periclinal chimaera, *Solanum Lycopersicum*—*tuberosum*, in which the Tomato was covered by an epidermal layer of the Potato, but the reciprocal chimaera, which he particularly desired, he was unable to obtain.

In his graftings of Tomato and nightshade, WINKLER obtained from one adventitious bud a branch which did not fit in with the chimaera hypothesis, but which appeared to be what is a true graft

hybrid or "burdo," i.e. a growth produced by the actual union of the nuclei of two vegetative cells. The plant derived from this branch was called *Solanum Darwinianum*, and the number of its chromosomes certainly seemed to bear out WINKLER's claim that it was a true graft hybrid. Unfortunately further investigation was impossible as the plant died down.

We have come to the end of our consideration of the so-called "graft hybrids," and you will have gathered that they differ materially in their nature from "seed hybrids." Almost all of them are explicable, by assuming that in the adventitious buds from which in all of the cases they have arisen at the point of grafting, the tissues of the stock have become covered by a skin of cells of the scion which they have carried up like a finger thrust into a glove; but both core and skin consist of living cells which are closely connected together. The occurrence of a real graft hybrid in which actual cells of stock and scion have fused together like the fertilization of an egg cell by a pollen grain is still very problematical.

PLANTS TO KEEP IN MIND.

CAMELLIA SALUENENSIS × *C. JAPONICA*.

By THE LORD ABERCONWAY.

THIS hybrid Camellia was raised several times at Caerhays, and is perhaps the most beautiful of all Camellias. It is very hardy—having endured at Bodnant a temperature down to zero, in the open, without losing a leaf or even a flower-bud.

The flowers are semi-double of a good pink shade—larger and deeper in colour than those of *Camellia saluenensis* itself. It is a most rapid grower, and makes a bushy plant with a shapely upright habit. It is very readily propagated from cuttings.

What, however, makes it a most desirable plant from a gardener's point of view is the extraordinary abundance of its flowers. Very often three or four terminal flowers are carried on a shoot with axillary flowers as well. These come out successively for a period of some weeks, but they are so abundant that, at any time during the long flowering period, the plant is more closely covered with flowers than almost any other Camellia in the garden (fig. 62).

The plant has another pleasing habit which commends it to the gardener, that of dropping its flowers as soon as they are over. Most other Camellias bear faded flowers as well as the fresh ones, so that unless the flowers are picked off the plant is unsightly. This hybrid is certainly one of the best gifts that gardeners have received from the late Mr. J. C. WILLIAMS.

SOME PLANTS IN THE SHOW.

May 1, 1940.

MR. J. COMBER, who gave the Informal Talk on May 1, spoke in an interesting manner on a wide range of plants, and the following is a résumé of his remarks :

The group of dwarf Rhododendrons at the entrance of the Hall is interesting. The specimens on the table are *Rhododendron fastigiatum* and *R. scintillans*. Both Captain KINGDON WARD and the late G. FORREST have told me that in China and Tibet dwarf Rhododendrons cover the moors just as Heaths do those of Scotland and England. They are never very tall in such positions, although the branches may spread for yards. Everyone, except the town-dweller or those whose gardens overlie chalk, can grow these Rhododendrons ; light sandy soil is especially suitable. They are among the easiest plants to propagate, and I often recommend people to adopt the following method : take a large 6-in. pot, put in 1 in. of drainage material and cover this with 3 in. of sand and peaty soil. Select in July soft, half-matured shoots $\frac{3}{4}$ in. to 1 $\frac{1}{2}$ in. long (according to the variety), remove the lower leaves and cut across with a sharp knife. Dibble in the cuttings and water them ; cover the pot with a piece of glass and stand them in a place where there is plenty of light but no direct sun—behind a north wall is excellent. The glass is easily removed for watering and ventilation. I have propagated many other plants in this manner.

Blue Rhododendrons are very popular to-day, and all hybridizers are trying to get nearer to a "true" blue, for those we have as yet are lavender and violet rather than "gentian" blue. So far the late Mr. J. J. CROSFIELD has been one of the most successful raisers.

The large-flowered Rhododendrons are especially noteworthy, and *Rhododendron Loderi* deserves a word of special commendation. It was raised at Leonardslee by Sir EDMUND LODER, whose gardener at that time was a Mr. PESCOTT, an old foreman of ANTHONY WATERER. I live not very far from Leonardslee and remember the batch of seedlings just about 6 in. high when they were showing their first large leaves. There are various forms of *R. Loderi*—'Pink Diamond' and 'King George' are good examples. When 'King George' is grown in the shade it is pure white. 'Pink Diamond' varies, but is sometimes a delicate pink. Such fine results are obtained by choosing the best possible parents. I have seen those which were used in this case and remember them to be the finest of their kind.

Berberis lologensis was collected by my son in the Andes when he was twenty-seven years of age. He went out quite alone, taking with him some of his equipment and having to obtain the rest out there. This plant loves the woodland and partial shade, and is a cross between *B. linearifolia* and *B. Darwinii* ; it has the colour of

B. linearifolia and the hardiness and vigour of *B. Darwinii*. Care should be taken to obtain a good form such as that exhibited. It obtained an Award of Merit on May 5, 1931.

Magnolia Sargentiana was introduced by WILSON, who collected for Messrs. JAMES VEITCH and others. Having spent a year learning the language and customs in China, he became a most successful collector and sent home a great number of plants. The difficulty to gardeners was to sift the plants, as some, which were of great interest to botanists, were of no use to gardeners. Unfortunately for WILSON many of the plants that flowered first were the poorest. This Magnolia, one of the finest of WILSON's plants, lived in this country for thirty years before it commenced to flower. Colonel STEPHENSON R. CLARKE, who exhibited the vase shown, tells me that he has no fewer than one hundred flowers on his tree. I leave you to imagine how beautiful it must be.

Clematis Armandii is a hardy Clematis, but from the fact that it is especially glorious in the South of France one may infer that it likes a warm position. A fine vase of it also was shown by Colonel STEPHENSON R. CLARKE. It is most important to grow a good form or variety. One of the best is 'Apple Blossom,' a very attractive variety shaded with pink. Some of the earlier types from WILSON's seed produced handsome foliage, but small greenish-white flowers.

PLANTS TO WHICH AWARDS HAVE BEEN MADE IN 1940.

Antirrhinum 'Lothrop's Double Pink.' A.M. May 21, 1940. A useful variety for cultivation under glass for market. It was raised in the U.S.A. by Mr. C. H. Lothrop of Lexington, Mass. The large double Carmine (H.C.C. 21/2) flowers are borne in long spikes admirably adapted for cutting. Shown by Messrs. C. Engelmann Ltd., Saffron Walden.

Aquilegia scopulorum. A.M. May 21, 1940. A delightful, striking species from North America, about 6 inches high, bearing large flowers varying in colour from palest lavender to Veronica Violet (H.C.C. 639/1 to 639/3). The spurs, of a deeper shade than the sepals and petals, are up to 1½ inch long and the sepals and petals about 1½ inch. The diameter of the flower is about 1½ inch. The small, tufted leaflets are bluish green. Shown by Charles T. Musgrave, Esq., Olivers, Hascombe, Godalming, Surrey.

Begonia 'Bertha Balmer.' A.M. May 21, 1940. A tuberous rooted variety with large double Carmine (H.C.C. 21/1) flowers of perfect form. Shown by Messrs. Blackmore & Langdon, Bath.

Begonia 'Délice.' A.M. May 21, 1940. A tuberous rooted variety of dwarf habit bearing large well-formed double Nasturtium Red (H.C.C. 14/2) flowers with beautifully waved petals. The colour

deepens towards the centre of the flowers to Nasturtium Red (14/1). Shown by Messrs. Blackmore & Langdon, Bath.

Campanula oreadum. A.M. May 21, 1940. An attractive, dwarf species from Mt. Olympus in Thessaly with ascending flower stems bearing up to 5 broadly campanulate, erect flowers about 1 inch long and bluish violet in colour. The lower leaves are spoon-shaped. Shown by H. Clifford Crook, Esq., 4 Alexandra Crescent, Bromley, Kent.

Cymbidium × 'Joyful.' A.M. May 21, 1940. This attractive hybrid bore an erect spike of 6 large and well-formed flowers, of Venetian red colour with venation of a deeper tint, the labellum yellowish with reddish markings on the front lobe. The result of crossing *C. × 'Joy Sander'* var. *magnificum* ♀ with *C. × 'Ceres'* var. *'F. J. Hanbury'* ♂. Raised and exhibited by Messrs. J. & A. McBean, Cooksbridge, Sussex.

Eulophia Rueppellii. A.M. April 30, 1940. This new species, a native of Abyssinia, was represented by a plant bearing seven erect spikes, the tallest of which carried twenty-four flowers. The attractive feature is the bright yellow colour of the petals and labellum. The sepals are greenish with reddish-brown markings. Shown by The Director, Royal Botanic Gardens, Kew.

Gaylussacia brachycera. A.M. April 30, 1940. A low spreading Ericaceous shrub, about 6 inches high, with small evergreen, slightly toothed leaves under an inch long on reddish-brown shoots, which are laden at their tips with small pink and white bells. A native of eastern North America, from Pennsylvania to Georgia, this shrub was first introduced into English gardens before 1805, but has never become common. It is figured in Botanical Magazine, vol. 24, t. 928 (1806), as *Vaccinium buxifolium*. Shown by Mr. W. J. Marchant, Wimborne, Dorset.

Malus ioensis plena. A.M. May 21, 1940. The semi-double flowers of this attractive Crab are borne 5 or 6 together in leafy, cymose inflorescences. When fully expanded the individual flower is fully 2 inches in diameter; in colour it is a beautiful shade of Carmine Rose (H.C.C. 621/1) internally and varying on the outside from Rose Madder (23/3) to Tyrian Rose (24/3). Shown by Iris Lady Lawrence, Dorking.

Malus 'Simeoe.' A.M. April 30, 1940. This handsome Crab was raised by Miss Preston at the Central Experimental Farm at Ottawa, and forms a vigorous tree of erect growth, flowering somewhat sparingly while young but later producing many 5-6-flowered clusters of flowers among the bronze-tinted young foliage. The fully expanded flower is well over 2 inches in diameter, in colour Rose Bengal (H.C.C. 25/2) fading to Solferino Purple (H.C.C. 26/3). Shown by Iris Lady Lawrence, Dorking.

Meconopsis superba. A.M. May 21, 1940. First discovered in the Chumbi district of Tibet in 1884, this most beautiful species was brought to cultivation from Bhutan and first flowered in England in 1927. It is monocarpic, producing during the vegetative stage a

large and dense rosette of oblanceolate, regularly serrate, silky-hairy leaves, in itself an object of great beauty. The pure white flowers are cup-shaped, 3 to 4 inches across, with a central cluster of golden stamens : they are borne singly in the axils of the uppermost leaves of a sturdy, erect stem. Shown by Lord Aberconway, Bodnant.

Narcissus 'Grey Lady.' A.M. April 30, 1940, as a variety for exhibition. A dainty small-crowned Leedsii variety (Division 4b) of the 'Mystic' type, with a flower about $2\frac{1}{4}$ inches in diameter, well poised on a slender 18-inch stem. The white, slightly reflexed perianth segments were smooth with a big overlap, the outer ones being about $1\frac{1}{2}$ inch long and nearly $1\frac{1}{2}$ inch broad. The disc-shaped corona was about $\frac{1}{2}$ inch in diameter, greenish-white, margined with a narrow band of Saturn Red (H.C.C. 13/1), approximately the colour of *Lilium Willmottiae*. Raised and shown by Mr. Guy L. Wilson.

Narcissus 'Ludlow.' F.C.C. April 16, 1940. As a variety for exhibition. A well-formed, white, giant Leedsii variety (Division 4a) with flowers $4\frac{1}{2}$ inches in diameter, borne on stout 20-inch stems. The perianth segments were smooth, broad and overlapping, the outer ones being nearly 2 inches long and about as broad. The corona which was slightly expanded and somewhat deeply indented at the margin, with a greenish-yellow base within, was just under $1\frac{1}{2}$ inch long and slightly more in diameter at the mouth. This variety, which was raised by Mr. A. M. Wilson and shown by Mr. J. L. Richardson, received a P.C. on April 13, 1939.

Odontoglossum × 'Phantasy,' East Burnham var. A.M. April 30, 1940. This handsome hybrid results from the crossing of *O. × Sidley* with *O. × Minotaur*. The spike bore four large flowers, in which the sepals and roundly-formed petals are purple-maroon in colour, while the labellum has a spiny crest of yellow colour. Shown by H. Barnard-Hankey, Esq., East Burnham Park, Bucks.

Rhododendron × 'Biskra' (*R. cinnabarinum* var. *Roylei* × *R. ambiguum*). A.M. April 30, 1940, as a hardy flowering plant for the woodland garden. The flat truss is up to 4 inches wide, containing narrowly trumpet-shaped flowers, 2 inches across, $1\frac{1}{2}$ inch deep and the lobe $\frac{1}{2}$ inch long ; the colour is between Vermilion H.C.C. 18/2 and 18/1. The elliptic leaves, dark green glabrous above, pale green and covered with many minute, crimson, resin-bearing cells beneath, are up to $2\frac{1}{2}$ inches long by $1\frac{1}{2}$ inch wide. Shown by Lionel de Rothschild, Esq.

Rhododendron × 'China' (*R. Wightii* × *R. Fortunei*). A.M. April 30, 1940, as a hardy flowering plant for the woodland garden. The loose truss is up to 9 inches across, containing up to seventeen flowers, $3\frac{1}{2}$ inches wide, $2\frac{1}{2}$ inches deep, creamy white. The narrowly ovate, dark green, glabrous leaves are up to $4\frac{1}{2}$ inches long by 2 inches wide. Shown by Messrs. W. C. Slocock, Ltd., Woking, Surrey.

Rhododendron × 'Cretonne' (*R. Barclayi* × *R. Loderi*). A.M. April 30, 1940, as a hardy flowering plant for the woodland garden. The loose flat-topped truss is up to 9 inches across and contains up to twelve flowers, 4 inches wide, 2 inches deep, the lobes $1\frac{1}{2}$ inch long ;

they are widely funnel-shaped, white, the lobes stained within and without Rose Bengal (H.C.C. 25/2). The broadly elliptic, pale green, glabrous leaves are up to 5 inches long by 2½ inches wide. Shown by Sir Giles Loder, Leonardslee, Horsham.

Rhododendron × 'Day Dream' (*R. × 'Lady Bessborough'* × *R. Griersonianum*). A.M. April 30, 1940, as a hardy flowering plant for the woodland garden. The loose trusses are up to 7 inches across, containing up to thirteen flowers, 3½ inches in diameter, 2 inches deep, the lobes 1½ inch long; they are widely funnel-shaped, deep crimson, flushed and shaded without Geranium Lake, very bright in the bud and fading to a very pale shade with age. The narrowly elliptic leaves are glabrous, mid-green above, pale green beneath, up to 4½ inches long and 1½ inch wide. Shown by Lionel de Rothschild, Esq.

Rhododendron × 'Electra' (*R. chasmanthum* × *R. Augustinii*). A.M. April 30, 1940, as a hardy flowering plant for the woodland garden. The numerous flower heads are up to 4 inches across and contain up to seven flowers, 2½ inches wide, about ½ inch deep and the lobes an inch long; they are violet blue, a shade brighter than Veronica Violet (H.C.C. 639/1) and marked with greenish-yellow blotches at the base of the upper lobe. The narrowly elliptic leaves are about 2½ inches long and ¾ inch wide, glabrous and rich dark green. Shown by Lionel de Rothschild, Esq., Exbury, Southampton.

Rhododendron × 'Fabia' var. 'Tangerine' (*R. dichroanthum* × *R. Griersonianum*). A.M. May 21, 1940. As a hardy flowering plant for the rock or woodland garden. The rather lax flower trusses are composed of up to 8 funnel-shaped, campanulate flowers. The latter are of 2½ to 3 inches diameter, the lobes 1 inch long. The setaloid calyx is irregularly incised and 1 inch long. The colour of the flower is Vermilion (H.C.C. 18/1), shaded towards the edges of the lobes Geranium Lake (H.C.C. 20/2) and in the throat of the corolla with Poppy Red (H.C.C. 16/1). The dark green lanceolate leaves are up to 5½ inches long by 2 inches wide, lightly felted with fawn tomentum beneath. Shown by Lord Aberconway, Bodnant, N. Wales.

Rhododendron gymnocarpum. A.M. April 30, 1940, as a hardy flowering plant for the woodland garden. The flat-topped truss is 4½ inches to 5 inches wide, containing up to ten flowers, each about 2½ inches across and 1 inch deep, the lobes ¾ inch long; they are funnel-shaped and deep rich crimson. The dark green, lanceolate leaves are up to 4½ inches long by 1½ inch wide, glabrous above and lightly felted beneath. Shown by Lionel de Rothschild, Esq.

DWARF GODETIAS TRIED AT WISLEY, 1939.

THIRTY-SEVEN stocks of dwarf Godetias were received at Wisley for trial in 1939; most of these belonged to the *Godezia Whitneyi* section, one to the *Godezia tenella* and another to the *Oenothera viminea* sections. The seed was sown in drills in the open on April 11, the rows being 18 inches apart, and the seedlings were thinned to 12 inches apart in the rows. They were judged by the Floral Panel, who made their recommendations for awards as given below. Full details and descriptions of the varieties which did not receive awards are recorded at Wisley, and those interested may obtain this information upon request to the Director.

In the following notes the varieties are grouped according to colour, and where possible the Royal Horticultural Society's Colour Chart has been used.

The following varieties were grown for comparison only: CRIMSON GLOW, DUCHESS OF ALBANY, FAIRY PINK, GORGEOUS, KELVEDON GLORY, LADY SATIN ROSE, SYBIL SHERWOOD.

FLOWERS WHITE.

White Swan Improved (raised and sent by Messrs. Watkins and Simpson, Drury Lane, Covent Garden, W.C.). H.C. August 17, 1939.—15 inches, of compact habit; flowers single, 2½ inches diameter, pure white. A true even stock.

PURITY (Bodger, Benary), WHITE PYGMY (Benary).

FLOWERS WHITE WITH COLOURED BLOTCHES.

HISTON GLORY (Unwin), MIGNON (Daehnfeldt).

FLOWERS OF SALMON-ORANGE EDGED WITH WHITE.

Orange Glory (raised and sent by Messrs. Sluis en Groot, Enkhuizen, Holland). A.M. August 17, 1939.—9 inches, of compact habit; flowers single, 1¾ inch diameter, a lighter shade of Vermilion H.C.C. 18/1 edged white. A deeper and redder 'Kelvedon Glory' type.

KELVEDON GLORY (Bodger, W. H. Simpson), SYBIL SHERWOOD (Bodger, Macdonald).

FLOWERS OF ROSE-PINK SHADES.

Maiden's Blush (raised and sent by Messrs. Sluis en Groot, Enkhuizen, Holland). A.M. August 17, 1939.—12 inches, of compact habit; flowers semi-double, 2½ inches diameter, Phlox-Pink H.C.C. 625/2. A true even stock. Also sent by Messrs. Watkins and Simpson and Messrs. E. Benary, whose stocks were less regular.

APPLE BLOSSOM (Benary), CHARMING (W. H. Simpson), DELICATA (Macdonald), SINGLE MAYFLOWER (Macdonald).

FLOWERS OF ROSE SHADES.

Firelight (raised and sent by Messrs. Watkins and Simpson, Drury Lane, Covent Garden, W.C.). **A.M.** August 17, 1939.—18 inches, of erect habit; flowers single, $2\frac{1}{2}$ inches diameter, Rose Bengal H.C.C. 25/1, base of petals white. A true even stock.

Thunderbolt (raised and introduced by Messrs. Hurst and sent by Messrs. E. Benary, Erfurt, Germany). **H.C.** August 31, 1939.—15 inches, of compact habit; flowers single, $2\frac{1}{2}$ inches diameter, a much deeper and richer tone of Rose-Madder H.C.C. 23, base of petals white. A true even stock. Also sent by Messrs. Bodger, a less regular stock.

BEGONIA ROSE (Sluis en Groot), **BRIGHT CRIMSON** (Sluis en Groot), **CARMINE GLOW** (Watkins and Simpson), **CRIMSON GLOW** (W. H. Simpson, Johnson), **DUKE OF YORK** (Bodger), **FLAMINGO IMPROVED** (Watkins and Simpson), **LADY SATIN ROSE** (Bodger), **METEOR** (Benary), **PELARGONIUM IMPROVED** (Watkins and Simpson), **ROSAMUND** (W. H. Simpson), **ROSE PYGMY** (Benary), **WILD ROSE** (Bodger).

FLOWERS OF MAUVE AND VIOLET SHADES.

Celestial (raised and sent by Messrs. Watkins and Simpson, Drury Lane, Covent Garden, W.C.). **A.M.** August 17, 1939.—15 inches, of erect habit; flowers single, $1\frac{1}{2}$ inches diameter, Mauve H.C.C. 633/1. A form of *Oenothera viminea*.

Blue Pygmy (sent by Messrs. E. Benary, Erfurt, Germany). **H.C.** August 17, 1939.—9 inches, of very compact habit; flowers single, $\frac{1}{2}$ inch diameter, Bishop's Violet H.C.C. 34/1. A form of *Gedelia tenella*.

FLOWERS OF VARIOUS SHADES.

AZALEA Show (Benary), **DWARF DOUBLE MIXED** (W. H. Simpson), **DWARF SHOW** (Benary).

DIMORPHOTHECAS TRIED AT WISLEY, 1939.

NINE stocks of Dimorphothecas were on trial at Wisley during 1939. These were sown in the open, in drills 18 inches apart, on May 25, 1939, the seedlings thinned to 9 inches apart in the rows. Most of the varieties were forms of *D. aurantiaca*. All grew and flowered well and were judged by the Floral Panel, who made their recommendations for awards as given below. Full details and descriptions of the varieties which did not receive awards are recorded at Wisley, and those interested may obtain this information upon request to the Director. One variety, 'Buff Beauty,' was grown for comparison only.

FLOWERS WHITE.

D. pluvialis ringens (sent by Messrs. W. H. Simpson, Monument Road, Birmingham). **A.M.** August 31, 1939.—12 inches, of erect,

compact habit, very free flowering ; flowers single, $2\frac{1}{2}$ inches diameter, white zoned at the disc with a metallic, reddish-blue band.

WHITE BEAUTY (Bodger).

FLOWERS OF YELLOW SHADES.

Orange Glory (raised and sent by Messrs. Watkins and Simpson, Drury Lane, Covent Garden, W.C.). **A.M.** August 17, 1939.—Plant 12 inches high, of erect, compact habit, free flowering ; flowers single, 3 inches diameter, Marigold-Orange H.C.C. 11, zoned blackish-brown at disc. A true even stock. Form of *D. sinuata*.

GOLDEN WEST (Bodger), **LEMON QUEEN RESELECTED** (Watkins and Simpson), **ORANGE IMPROVED** (Bodger).

FLOWERS ORANGE-SALMON.

Salmon Beauty (raised and sent by Messrs. Bodger Seeds, El Monte, California, U.S.A.). **H.C.** August 31, 1939.—Plant of erect but somewhat spreading habit, 16 inches high, free flowering ; flowers 2 inches diameter, single, soft orange-salmon zoned at base ; disc bluish. A true stock. *D. aurantiaca* form.

FLOWERS OF CREAM, ORANGE, SALMON AND YELLOW SHADES.

NEW HYBRIDS (Watkins and Simpson), **D. AURANTIACA HYBRIDS** (W. H. Simpson).

OUTDOOR CUCUMBERS AT WISLEY, 1939.

SOME twenty-five stocks of Cucumbers for growing in the open were received at Wisley for trial during 1939. These along with four varieties for comparison only were sown under glass in 3-inch pots—one seed to each pot—on May 25, 1939. They were planted into their permanent positions on June 22, 1939, in rows 5 feet apart, 2 feet separating the plants in the rows. All grew well with the exception of those varieties which were attacked by the Cucumber mild mosaic ; this, though not actually killing the plants, had the effect of weakening and somewhat dwarfing their growth, thus being an unfavourable factor for satisfactory results. The varieties attacked by this mosaic are mentioned in the descriptions. The trial was judged by the Vegetable Panel, who made their recommendations for awards as given below. Full details and descriptions of the varieties which did not receive awards are recorded at Wisley, and those interested may obtain this information upon request to the Director.

The varieties grown for comparison were : **CHINESE**, **DELICACY**, **KING OF THE RIDGE**, **LONG GREEN**.

FRUIT ALMOST ROUND.

CRYSTAL APPLE (Ferry-Morse), **LEMON** (Ferry-Morse).

FRUIT ELONGATED.

Sensation (sent by Messrs. F. C. Heinemann, Erfurt, Germany). **F.C.C.** August 30, 1939.—Plant of vigorous growth. Fruit 9 to 12 inches long, 2 to 3½ inches diameter, almost spineless, very slightly ridged, little or no neck, flesh thick, of sweet flavour, very dark green and remains so. Crop heavy.

A. AND C. (Ferry-Morse; Mosaic bad), **BLACK DIAMOND** (Ferry-Morse; Mosaic bad), **DANIA GIANT IMPROVED** (Ohlsens Enke), **DANISH PICKLING IMPROVED** (Ohlsens Enke), **IDEAL** (Sluis Bros.; Mosaic bad), **IDEAL** (Zwaan and de Wiljes, Daehnfeldt), **JERSEY RIDGE** (Cooper Taber), **LONDON RIDGE** (Nutting), **LONGFELLOW** (Ferry-Morse), **LONG GREEN** (Ferry-Morse; Mosaic bad), **LONG GREEN** (Bunting), **ROBUSTA OR STAY GREEN** (Sluis Bros.), **STRAIGHT EIGHT** (Ferry-Morse; Mosaic bad).

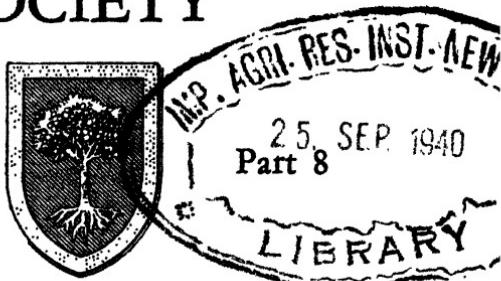
FRUIT CYLINDRICAL.

Longa (raised and sent by Messrs. Zwaan and de Wiljes, Scheemda, Holland). **A.M.** August 30, 1939.—Plant of vigorous growth. Fruits 12 inches long, 2 inches diameter, dark green; flesh ½ inch thick, of good flavour; neck short. Crop heavy. A good even stock.

CARTERS' OUTDOOR (Carters), **LANGELANDS GIANT** (Daehnfeldt), **PERFECTION** (Watkins and Simpson), **REX** (Zwaan and van der Molen), **RIESSENSCHAEL** (Benary), **TORPEDO** (Benary), **WITHER'S RIDGE** (Clucas).

JOURNAL OF THE ROYAL HORTICULTURAL SOCIETY

Vol. LXV



August 1940

THE SECRETARY'S PAGE.

RED CROSS SALE, SEPTEMBER 24 AND 25, 1940.

IT is very gratifying to report that the response on all sides for the Society's Horticultural Red Cross Sale has been extremely satisfactory, and all donors of gifts are sincerely thanked for their co-operation.

The process of compiling the catalogue is now in hand and copies will be obtainable from the Society's Offices at 2s. 6d. each, the proceeds of the catalogue going to the Funds of the Red Cross Sale. The cover will have an attractive design by Mr. OLIVER MESSEL. It is hoped that there will be a good demand for the catalogue, orders for which can now be registered.

FOOD PRODUCTION.

Emphasis has been laid in many public speeches by the Minister of Food and the Minister of Agriculture and Fisheries on the vital necessity of increasing the production of food from the garden. The Society hopes that Fellows will make every effort to use to the best advantage all available ground which is capable of producing food economically. It has been stated that it is the duty of every gardener to make himself as far as possible self-supporting in vegetables and, if circumstances allow, to grow a reserve of vegetables for use in winter and early spring. Reminders of work in the kitchen garden appear each month in the JOURNAL, and the Society will be glad to advise Fellows upon matters concerning the growing of increased vegetable supplies.

LECTURE PROGRAMMES FOR THE AUTUMN AND WINTER.

It is now the time to consider programmes of demonstrations in actual gardens and allotments and of lectures for the Autumn and

Winter months. These will be especially appreciated by the many beginners who will be glad of the opportunity to learn and to be able to rectify mistakes of their first year of gardening.

Fellows and Associates, and especially Affiliated Societies, are therefore reminded of the Society's panel of lecturers and demonstrators which has been drawn up in agreement with the Ministry of Agriculture and Fisheries. The lecturers and demonstrators give their services free and only the cost of their out-of-pocket expenses has to be met. All applications should be addressed to The Secretary, Royal Horticultural Society, Vincent Square, Westminster, S.W. 1, giving the time, date and location of the lecture or demonstration. The production of vegetables is a matter of national importance. Improved cultivation saves seeds and eliminates wasteful production.

PRACTICAL DEMONSTRATION AT WISLEY.

A practical demonstration will be held at Wisley on August 21-22, from 2 to 4 P.M. (weather permitting), on the Vegetative Propagation of Plants. In order that arrangements may be made those Fellows desiring to attend should notify the Director of the Gardens beforehand. Visitors should not forget to visit the vegetable trial grounds.

SEED SAVING.

Fellows, Associates and Affiliated Societies are reminded of the importance of saving such vegetable seeds as they can. This applies especially to Peas and Beans at the present moment. It would be a wise precaution to select a few good specimens of Carrots, Onions, Parsnips and Beetroots as they mature to place in store for planting out in spring to produce a crop of seeds in 1941.

AGRICULTURAL WAGES.

With regard to the new agricultural rate which came into force on June 30, persons who employ gardeners and who are in doubt whether their employees come under the Act or not, should make inquiries at the Ministry of Agriculture and Fisheries, King's Buildings, Dean Stanley Street, Westminster, S.W. 1. The new rates make no change in the definition of an agricultural labourer. The Society understands that persons engaged upon work in private gardens are not employed in agriculture within the meaning of the Agricultural Wages Regulation Act, 1924, unless the produce of the gardens is grown wholly or mainly for sale. Employment in agriculture is defined in the Act as including employment in connexion with the use of land as orchard land, market gardens or nursery grounds.

TRIAL OF GARDEN PINKS.

It is desired to establish at Wisley a standard collection of Garden Pinks and their hybrids and to conduct trials of new varieties.

Fellows who desire to submit varieties to the Gardens at Wisley for the standard collection and for trial are asked to send five plants of each variety, and submit the list of names they desire to enter for

trial, to the Director of the Gardens at Wisley. These plants and lists should be sent any time between the months of September and March. The adjudication will be done under the Joint Border Carnation and Picotee Committee.

LINDLEY LIBRARY.

The Library is open daily (Sundays and holidays excepted) from 10 A.M. to 5 P.M. (Saturdays 10 A.M. to 12.30 P.M.).

Anyone requiring the loan of a book to be taken from the Library must make written application to the Secretary, and loans will be granted under certain conditions, but all books borrowed must be returned to the Library in good condition within one month from the date of issue.

Fellows requiring books on loan from the "Outlier" Libraries, that is to say Libraries associated with the National Central Library, should make written application either to the Secretary of the Society or to the National Central Library, Bourne Lodge, Bourne End, Hemel Hempstead, Herts.

THE SOCIETY'S EXAMINATIONS.

Teachers' Preliminary Examination in School and Cottage Gardening, held on March 16, 1940.

Two hundred and thirty-three candidates entered for this Examination, and of these : 52 were placed in Class 1 ; 49 in Class 2 ; 53 in Class 3 ; 53 candidates failed ; and 26 were absent.

A Silver-gilt Medal is awarded to Mr. Horace James Eaton, of 52 Burlington Avenue, Kew Gardens, Richmond, Surrey, who was First.

Teachers' Advanced Examination in School and Cottage Gardening, held on June 6-7, 1940.

Twenty-eight candidates entered for this Examination, and of these : 15 passed (2 with Honours) ; 12 failed ; and 1 was absent.

National Diploma in Horticulture, Preliminary Examination, held on June 10-14, 1940.

Sixty-two candidates entered for this Examination, and of these : 28 passed ; 27 failed ; and 7 were absent.

National Diploma in Horticulture, Final, Section 1 (General Horticulture), held on June 18-21, 1940.

Forty-seven candidates entered for this Examination, and of these : 27 passed ; 18 failed ; and 2 were absent.

Final, Section 3 (Market Gardening), held on June 26-27, 1940.

Two candidates entered for this section, and one passed.

Final, Section 5 (Landscape Gardening), held on June 26-27, 1940.

One candidate entered for this section, and passed.

*Final, Section 6 (Gardening in Public Parks),
held on June 26-27, 1940.*

Four candidates entered for this Examination, and of these: 1 passed; 2 failed; and 1 was absent.

The following have been awarded the National Diploma in Horticulture:

Section 1—General Horticulture.

Bruce, James	Lewis, William Herbert
Bryant, Sidney Frederick Ballam	Miles, Reginald Frederick
Cluley, Miss Margaret Hermonie	Naish, Miss Evelyn M.
Dehn, Miss Marie Dorothea	Oldfield, Tom Merton
Ebsworth, Harry Richard	Redman, James
Elliott, Miss Dorothy Mary	Robertson, Thomas
Gatecliff, Miss Mary	Schooling, Miss Molly Winifred
Grubb, James Alexander	Shaw, Frank
Horsey, Bernard James	Sivyer, Geoffrey R.
Hume, William Goodall	Swabey, John
Jefferiss, Adrian	Whitham, Bryan
Laflin, Thomas	Williams, Geoffrey Charles
Lammiman, Arthur Harry	Willmott, Peter Kincaid
	Wright, Cecil.

Section 3—Market Gardening.

Whittle, Thomas Andrew.

Section 5—Landscape Gardening.

Blackman, James Andrew Eyre.

Section 6—Gardening in Public Parks.

Boddy, Frederick Arthur.

WISLEY IN AUGUST.

THE brightest displays this month will be seen among herbaceous plants, both in the Trials and in the standard collections on the hill-side, as well as on the herbaceous border situated between the glass-houses and Seven Acres.

Of the former there will be Dahlias and Gladioli, varieties of *Scabiosa caucasica*, of *Aster Amellus* and *Lobelia fulgens*, Montbretias, Roses, and towards the end of August the first of the early-flowering border Chrysanthemums. All of these can be seen in succession by turning to the left off the main Rose walk between the broad Dahlia borders and thence proceeding up the hill. By the path leading up to the Alpine house, running parallel to the Pear orchard, are the borders of annuals which are perhaps at their zenith near the beginning of the

month, although so many varieties are used that a long season extending well into September is obtained.

In the Alpine house there are, as usual, several plants of interest or beauty to be seen, among them various species of *Campanula* such as the trailing *C. cashmiriana* with slender blue bells, the white-flowered *Gentiana saxosa* from New Zealand, the tender, shrubby *Gilia californica* with needle-like leaves, pink *Limonium (Statice) ornatum* of delicate appearance, the prostrate *Nertera depressa* with its bright orange berries, and the white flowers of *Oxalis magellanica*, native, like the last, of South America. On the rock garden many very attractive plants are in bloom at this season. They include various Gentians, of which *G. Farreri*, *G. ornata*, and *G. gracilipes* will serve as examples, *Cyananthus microphyllus* and *C. lobatus* var. *insignis*, and *Adenophora palustris*—all blue-flowered plants, the pink, scrambling *Convolvulus althaeoides*, the scarlet *Mimulus cardinalis* beside the upper pool, and *Zauschneria mexicana* in a drier position, *Roscoea purpurea* var. *pallida* with its curiously shaped, hooded, pale lilac flowers, and a small shrub, *Satureia montana*, much beloved by the bees. The Yuccas as a rule are most noticeable on the alpine meadow in August, but owing to the damage they received during the past winter are not likely to be so this year, although a large specimen of the fragrant shrub *Clethra alnifolia* will probably be full of flower as usual.

In the Wild Garden the Willow Gentian (*G. asclepiadea*) is much to the fore with its waving sprays of deep blue or white bells; so also are some of the Lilies, especially the tall *L. superbum* in damp places, where it may attain 10 feet in height and bear forty or fifty flowers; the Tiger Lily is well represented by the variety *splendens* in the Azalea garden. Of shrubs, the Hydrangeas are some of the chief, with the handsome *H. paniculata* var. *grandiflora*, *H. quercifolia*, and *H. serrata* all in bloom now in various shady positions. The scarlet *Tropaeolum speciosum* is to be found twining among the Azaleas close to a tall plant of *Hamamelis japonica*.

Some of the shrubs in Seven Acres will already have reached the stage of fruiting; these include some species of *Berberis*, such as *B. Verna*, *B. vulgaris* and *B. koreana*, and of *Cotoneaster*, *C. multiflora*. The Hypericums are perhaps the most useful of the August-flowering shrubs, especially the several forms of *H. patulum*, notably var. *Forrestii*, and the smaller but very free-flowering *H. prolificum* from eastern North America. Buddleias of the *Davidii* group, and their hybrids classed as *B. Weyeri*, besides the rather less hardy *B. Fallowiana*, are also valuable for providing colour in the shrub borders. The Heath Garden should not be overlooked, since the Connemara Heath, *Daboecia polifolia*, and forms of the Scotch Heather (*E. cinerea*) normally provide large splashes of rose or purple hues in August and September. This year, however, they also have suffered too heavily from the winter cold to be capable of their usual display; their place must be taken by some of the varieties of the Cornish (*E. vagans*), as well as the Corsican Heath (*E. terminalis*), which is reasonably hardy,

and our native Ling (*Calluna vulgaris*), in its many forms varying in colour and stature.

Among the large collection of *Rosa* species in Howard's Field, near the river bank, a good number will be found with coloured hips, the most decorative being the Japanese *R. rugosa*, *R. Seginzowii* from N. China, *R. oxyodon*, and the large and bristly European *R. villosa* (*pomifera*), so like one of the red-berried Gooseberries. Those who are interested in vegetables should take the opportunity to visit the trials of spring-sown Onions in the Vegetable Ground, which is only a short distance from Howard's Field, on the further side of the road through the village. The entrance is beside the shop on a sharp corner.

In the Vegetable Ground will be seen, besides the Onions, good trials of Carrots, Haricot Beans and Kales, while there is also a large and representative collection of vegetables well worthy of inspection. In the Commercial Fruit Trial plantations the Plum crop will be at its best during the month and a visit will be full of interest.

Returning to the Gardens the herbaceous border claims attention, for here may be seen the cream of plants most suitable for this feature of modern gardens. Now in flower are varieties of *Lobelia fulgens*, *Heliopsis*, *Anemone japonica*, *Phystostegia virginiana* var. *rubra*, Rudbeckias, *Strobilanthes atropurpureus*, the bigeneric hybrid *Solidaster luteus*, and very many more.

In the Award of Merit Garden a large group of *Monarda didyma* 'Cambridge Scarlet' is an illustration of how effective this Bergamot can be when planted *en masse*.

Finally we may walk through the glasshouses, to see the Pelargoniums and Fuchsias still in bloom in the Temperate house, together with the semi-double rose-pink form of the Oleander, the waxy bells of the climbing evergreen *Lapageria rosea*, stiff yellow spikes of *Hedychium Gardnerianum*, and perhaps some of the latest blue flowers of that giant member of the Potato family, *Solanum Wendlandii*, from Costa Rica. The Half-Hardy house will probably be able to show the profuse yellow flowers of *Calceolaria Pavonii* trained to one of the supports on the west side, *Limonium (Statice) rosea* with its ornamental and attractive sprays of soft pink colour, the yellow Daisies of the Mediterranean *Asteriscus maritimus*, and the large pink cups of *Oxalis Bowiei*, one of the best members of that family, although unfortunately not hardy in the open.

THE KITCHEN GARDEN IN AUGUST.

DURING early August planting of all available ground with Brassica crops should be pushed forward. Late Broccoli, late Savoys and Kales should be put in. It is important this year that no young plants of these winter Brassicas should be allowed to remain unused, and after all available ground has been planted it would be a good plan to offer any surplus plants to neighbours or friends who have ground that could be utilized for their reception.

During the first ten days of the month sowings should be made of spring Cabbages, and during the first fortnight sufficient winter Spinach seed should be sown in drills fifteen inches apart to produce a good supply. Ground from which Potatos and Peas have been cleared may be utilized for sowings of Turnips, and if there is any ground still unoccupied further sowings of stump-rooted Carrots and round Beet should be put in, as these crops will prove of inestimable value during the coming winter.

Sowings of winter Onions should be made during early August in northern districts and up to the end of August in southern districts. The variety 'Autumn Triumph' is specially recommended for this purpose. Sowings also of the 'White Lisbon' variety should be made before the middle of the month for pulling green. During the first fortnight of August Batavian Endive should be sown, and in the third week of the month sowings should be made of winter Lettuces such as 'Arctic King' or 'Imperial.' It is also a good plan to make a small sowing of Parsley for spring use.

It should be remembered that Runner Beans and Celery will require copious supplies of water during the month and the earliest batches of the latter crop should be earthed up after care has been taken to see that the plants are thoroughly moist at the roots and free from suckers. As a precautionary measure against the Celery leaf rust all plants should be sprayed occasionally with Bordeaux mixture, and dustings of soot applied between the sprayings will also prove beneficial. Autumn-sown Onions which are now nearing maturity should be lifted and laid out on the ground to ripen during the month.

Strawberry runners layered last month are established on their own roots by cutting the connecting runner. Keep the young plants well watered, and in ten days they can be transferred to the fruiting bed. Prepare the bed by deep cultivation, adding a generous application of farmyard manure. Firm the soil before planting. Plant firmly but not deeply, disturbing the roots as little as possible. Allow eighteen inches between the plants and two feet between the rows.

Raspberries are pruned immediately after fruiting by cutting out all the old canes down to ground level. Should there be too many

young canes remove the weak and unhealthy ones, leaving six or seven of the strongest canes to each stool.

Prune Black Currants as soon as the fruits have been gathered by cutting out the old wood, retaining the young shoots, particularly those shoots which arise from low down on the bush. Pruning at this period permits the young Black Currant growths to ripen properly during the autumn.

Early dessert varieties of Apples, for example 'Beauty of Bath,' 'Mr. Gladstone,' 'Lady Sudeley,' etc., are now beginning to ripen. These varieties are best used immediately they are gathered from the tree as they do not retain their flavour for any length of time. Make successional pickings. Likewise use the early culinary Apples, such as 'Early Victoria,' 'Lord Suffield,' and 'Lord Grosvenor,' as they mature; such varieties do not keep in store. Early varieties of Pears have also a short period when at their best and are used as soon as ripening is observed.

Pot Strawberries into six-inch pots for forcing, using a good compost. Place the pots in a cold frame which has an ash base. Syringe in the morning and evening and carefully attend to watering and other operations to ensure strong crowns.

Late Vines, such as 'Lady Downe's Seedling' and 'Alicante,' will benefit from a little pipe heat during cold nights and damp days; as the berries begin to colour increase the ventilation on favourable days and if watering is necessary do it in the morning.

In the late Peach house encourage good colouring of the fruits by tying back any overhanging foliage.

DRYAS OR MOUNTAIN AVENS.

By G. H. PRESTON, Royal Botanic Gardens, Kew.

THIS interesting genus belongs to the family of Rosaceae. The species are commonly known as Mountain Avens, and are of elegant, dwarf, evergreen, shrubby habit. Native of high mountains, or Arctic regions of Europe, Asia, and N. America, they are perfectly hardy and very suitable for the rock garden.

They are closely allied to Geum, differing in their shrubby habit, simple leaves, solitary flowers, and whereas in Geum there are five sepals and petals, in Dryas there are from eight to ten, and the styles, which have no articulation, grow out into long feathery awns as in Clematis and the Pulsatilla section of Anemone. This is one of the many interesting parallelisms between Rosaceae and Ranunculaceae. Some of the species of Dryas are very decorative in fruit.

The best known is our own native species, *Dryas octopetala*. Though a British plant there is no more beautiful representative of the genus, fully deserving of a place in all rock gardens.

The Oak-like outline of the leaves of the genus attracted the attention of the early writers, LINNÆUS, LOBEL, CLUSIUS, DALECHAMPS, MORISON and others, and it was from the resemblance of the foliage to the Oak leaf that LINNÆUS founded the genus (*druas*, tree nymph, from *druis*, oak).

Its large white blossoms with golden anthers resemble those of Cistus, and CLUSIUS called it "the alpine Ground-oak with the flower of a Cistus" (*Chamaedrys alpina, cisti flore*).

The species of Dryas are of easy cultivation, given a sunny position in reasonably good well-drained soil; but they resent being disturbed when young, and they early develop long, thick, woody tap-like roots which penetrate well down into the soil. As the plant spreads, however, fibrous roots form along the stems which come into contact with the surface of the soil, so that a plant at that stage can be more easily transplanted, while pieces with fibrous roots attached can be broken off and established as separate plants.

The best and easiest method of propagation is by cuttings taken in July and early August from half-ripened growths inserted in sand and placed in a close frame until rooted, after which they may be potted into small pots.

Plants may be raised from seeds, which are readily produced and if sown as soon as ripe will germinate freely; but seedlings are rather shy to flower at first, so that two or three years will elapse before a good flowering plant is obtained.

Dryas Drummondii replaces our British species in N. America, where it grows in the woody parts of Quebec, Oregon, and Nevada.

It was first discovered by Dr. RICHARDSON and THOMAS DRUMMOND during Sir JOHN FRANKLIN's expedition at the beginning of the nineteenth century, but only in fruit, and was then considered and recorded as probably a form of *Dryas octopetala*. On the second expedition some years later it was found again, this time in flower, growing freely upon gravelly parts of rivers in the Rocky Mountains and about Slave Lake, where the colour of the flowers and remarkable appearance of the foliage were very different from *D. octopetala*. It is a beautiful plant in its own country, with large bright yellow flowers.

The scapes, 3 to 4 inches high, which lengthen as the fruits develop, are clothed with tomentum of bright snowy whiteness, as also are the under-sides of the somewhat rugose, coarsely crenate leaves. Unfortunately in this country it is a rather disappointing plant, although it grows quite as freely as *D. octopetala*, and forms a profusion of pendulous buds which never seem to open. Some day a form may appear that will produce perfect flowers, or some secret of cultivation may be discovered, and we may have in our rock gardens a display of its beautiful golden flowers.

Another species widely distributed throughout the Arctic regions of N. America, and into Greenland, is *Dryas integrifolia*. It is a pretty miniature of our native species, with narrow leaves, usually entire, or with perhaps one or two teeth near the base. The leaf margins are

mostly revolute. The small delicate white flowers are quite in keeping with the plant. It is sometimes known as *D. tenella*.

Dryas octopetala is our native species ; it is found all over the North Temperate and Arctic region, not uncommon in the limestone mountain districts of Northern England and Ireland. It is particularly abundant in the North of Scotland, where it reaches an altitude of 2,700 feet, descending to sea-level in North and West Ireland.

Its masses of rugose, elliptic, somewhat Oak-shaped leaves form flat evergreen carpets. The leaves are deeply and regularly crenate, and the under surface is of a hoary whiteness. In June and July is produced a profusion of large delicate white flowers with numerous yellow stamens, the whole flower being an inch or more in diameter. These are followed by heads of beautiful silky awns which are really the developed styles.

There are several geographical forms, some with large flowers, such as that from Mont Cenis, while the Dolomite form is said to be so very poor as hardly to be recognizable. From the Engadine and Monte Baldo is a form the blossoms of which are of a very soft shell-pink as they open, but afterwards fade to white.

D. octopetala var. *minor*, another dainty form half the size, in all its parts, of the type, is a delightful little plant.

D. octopetala var. *vestita*, sometimes known as *D. lanata*, is small in all its parts, somewhat of the size of *D. integrifolia*, but differs in being covered all over with a coating of fine greyish down. Double and semi-double forms are found, and in the Alps it is occasionally androdioecious, i.e. with hermaphrodite plants, and those with staminate flowers only.

× *Dryas Suendermannii*, an attractive hybrid of *D. Drummondii* × *D. octopetala*, raised and sent out by SÜNDERMANN some years ago, is a very handsome plant with a cheerful and vigorous habit, and free flowering like its mother, showing a trace of *D. Drummondii*, the pollen parent, in its pale yellow buds, which open into large saucer-shaped white flowers, followed by fruits equal to if not even more attractive and decorative than those of *D. octopetala* (fig. 74).

D. tomentosa, from the Canadian Rockies, with bright yellow flowers, leaves coarsely crenate and tomentose on both surfaces, like *D. Drummondii*, is not a very successful plant in this country.

MASTERS MEMORIAL LECTURES, 1940.

GRAFT HYBRIDS AND CHIMAERAS—II.

By PROFESSOR F. E. WEISS, D.Sc., LL.D., F.R.S., F.L.S.

[Sir A. HILL, K.C.M.G., Sc.D., F.R.S., F.L.S., V.M.H., in the Chair.]

In the first lecture (published in the July issue of the JOURNAL) I dealt with the origin of chimaeras after grafting. Both sectorial and periclinal chimaeras have been formed in this way, the latter, *i.e.* periclinal chimaeras, by some tissue of the stock pushing upwards the tissues of the scion during the formation of adventitious buds, which have arisen at the point of union of stock and scion.

Chimaeras may, however, arise in other ways too. By a little understood process of internal change called mutation, certain buds of a plant may produce shoots differing in various respects from the normal plant. Cut-leaved varieties, for example, have arisen in this way in a great number of plants. Golden-leaved and variegated varieties have similarly made their appearance by mutation. In both of these the normal character of the plant has become altered by a failure, or partial failure, of the leaves to form the normal green colouring matter of plants. The characteristic green colour of plants, called chlorophyll, is composed of two green and two yellow chemical substances, and if one of the green-coloured substances is missing or not present in sufficient quantity the leaves will be golden. In other cases the small rounded bodies, or granules, which normally contain the chlorophyll may be small or absent altogether in certain portions of the leaf, when we speak of it as variegated. The white portions may occur quite irregularly on the leaf, giving it a mottled appearance. Cases of such mosaic variegation are familiar to all horticulturists. Probably the Box Elder (*Acer Negundo*) is the most commonly seen tree with variegated foliage. It is not easy to assign a cause for the occurrence of such variegations. It may show itself in a seedling plant and may be due to some constitutional lack of vigour which prevents the plant from forming the normal green colouring matter in all its cells. In this connection it may be of interest to note that in the Welsh plant breeding station it has been found that a larger number of pale or albino grass seedlings are found among the offspring of self-fertilized plants than when the latter are cross-fertilized.

We also know that when attacked by some virus diseases a number of plants assume a mosaic variegation. To this category of diseases belongs, probably, the so-called infectious chlorosis of the Malvaceae first recognized in *Abutilon striatum*, a variegated form of *Abutilon Thompsonii*. When this mosaic variety was grafted on green stock the latter became affected or infected and its leaves became mottled.

This variegation, due to disease, is transmitted by grafting, but not through the seed of the plant. While mosaic variegation may be developed occasionally in seedlings of green plants it may arise on shoots of a mature plant by sporting or bud variation. It can also be produced, as BAUR has shown in the case of the garden Geranium (*Pelargonium*), by crossing a flower of an ordinary green plant with the pollen from a flower borne on an albino branch. If this is done, all the seedlings will have seed leaves showing mosaic variegation. If these plants are grown on, the mature plants will vary according to the nature of the cells which occupy the tip of the stem. If these cells are green, the seedling will develop into a normal green plant. If the cells are white the young plant will be an albino, but not being able to nourish itself owing to the absence of green colour it will die off. If the



FIG. 63.

- a. Young seedling of *Pelargoniflum* showing mosaic distribution of variegation. The green portions are coloured black. The apex of the young shoot has both green and colourless tissues.
- b. A later stage of the seedling which has produced one white, one green and one parti-coloured leaf. Such a plant is called a sectorial chimaera.

tip of the shoot contains both green and white cells, some of the leaves will be green, others white, and some will be partly green and partly white, as seen in text fig. 63. Such a plant is termed a sectorial chimaera, a larger or smaller sector of the stem being occupied by white tissue.

It may also happen that at the stem apex there are only one or two layers of white cells covering in the central green tissue as shown in text fig. 64 a. This arrangement is termed a periclinal chimaera, since the white tissue bends around the central green core. When the leaves are formed on such a periclinal chimaera they will be seen to have a white margin around a green centre (see fig. 64 b). This is due to the fact that in the development of the leaf the margin is derived from the two outermost layers of the stem only, and, as these are white, the leaf margin is of this nature, as will be seen from fig. 64 c.

Varieties with such white-margined leaves are known in a large number of plants, such as *Pelargonium*, Ivy, *Euonymus*, Holly,

Elaeagnus, etc. They are sometimes called *albomarginata* or *albotunicata*, and we may speak of them as white-over-green chimaeras, as they have a white covering over a green core. The converse arrangement also exists in the case of most of these plants. That is to say there are varieties which are green-over-white chimaeras in which the central tissues are white and the covering tissues green. In such cases the leaves have a central light area surrounded by a green margin. Figs. 66 and 67 show the two types of green-margined and white-margined leaves in the case of *Elaeagnus pungens*. It will be noted that in both varieties the green is not uniformly deeply coloured. A microscopical examination of the leaves will show that in the lighter green portions

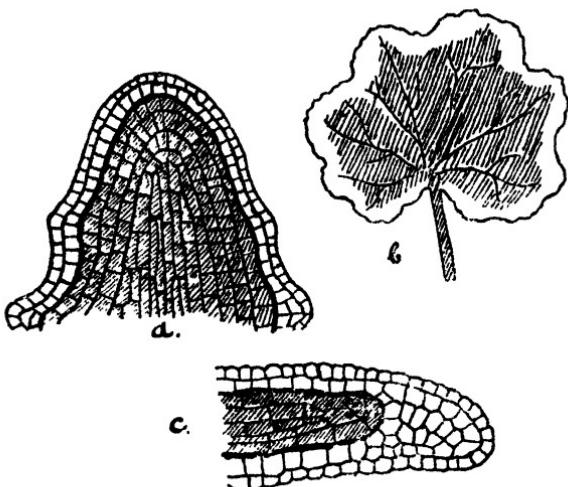


FIG. 64.

- Tip of shoot of a periclinal chimaera of *Pelargonium*. The central green core is covered by two layers of colourless cells.
- Surface view of a leaf produced by such a stem. It has a white margin and a green centre.
- Section of the margin of such a leaf, showing the green central tissue and the white margin produced by the multiplication of the colourless cells.

of the leaf the colourless cells have multiplied at the expense of the green tissue, whether the latter is external or internal.

Occasionally it may be observed that a white-margined variety may pass over in some of its leaves into a green-margined form. It has been difficult to explain how this could be brought about, but Miss MASSEY has shown that the peripheral white or colourless portion may dive into the central green area and so cause the inversion of the green and white portions.

Since the green chlorophyll granules are the nutritive organs of the leaves we find that the green cells usually grow larger than the colourless ones and, therefore, in some of the white over green chimaeras the leaves are not always smooth but become a little buckled, the skin not growing enough for the more rapidly growing green cells of the interior of the leaf. On the other hand in the *Pelargonium 'Freak of Nature'*,

which is a green over white chimaera, the greater growth of the green margin causes the latter to become folded.

As in the case of the graft hybrid, so in the case of these white and green periclinal chimaeras, certain branches of the white-margined and green-margined plants not infrequently revert back to pure green or pure white branches. These must be cut out if the original white-margined variety is to be maintained. It is particularly necessary to cut out the green branches as these, being more vigorous in their growth, are likely to entirely overshadow the variegated parts of the plant.

One would expect that the reverions would be more common to the type of the core, which is present in larger quantities of tissue, and when this is the case it can be explained by its breaking its way through the more delicate outer skin, which is liable to injury. This, as I mentioned in my first lecture, has actually been done experimentally in the case of the graft hybrid *Cytisus Adami* by puncturing the young buds. It is less easy to understand how reversion should take place to a branch composed entirely of tissues of the skin which consists of only two layers of cells, yet, as Sir DANIEL HALL pointed out to me, in the collection of variegated Hollies at the John Innes Horticultural Institute such reversion is more usual. An investigation of a number of such cases I understand has shown that in certain branches the outer skin varies in thickness from the normal two layers, which produce the white-margined leaves, to as many as six layers of colourless cells. When this is the case the leaves will be quite white, since they are formed from the three outermost layers of the stem. Occasionally this excessive thickness of the outer colourless cells will be irregular in its appearance and may not occupy the whole circumference of the stem, some portions still retaining the normal two layers of cells, as can be seen from fig. 65, which represents a section taken across such a branch. In such a case the leaves borne along the line of the stem marked *a* with two rows of skin cells will be white-margined, as are the two leaves of the branch shown in fig. 69, while the remaining leaves produced from the part of the stem which has many layers of colourless cells, *b*, are white. It will also be noticed that these albino leaves are smaller than the variegated leaves as the latter contain a fair amount of green cells which build up the nutritive material of the leaf.

Another specimen illustrating the irregularity in the number of colourless skin cells of the stem is seen in fig. 68. Here about one-half of the circumference of the stem is occupied by two rows of colourless cells on the right side of the shoot, which bears a white-margined leaf, while the portion of the stem with a thick coating of colourless cells has produced a white leaf much smaller in size owing to the absence of food-forming cells. The median leaf, which is twisted a little out of position, has arisen at the junction of the thin and thick portions of the colourless skin of the stem. It is, therefore, half white and half white-margined. The latter, being more vigorous in its growth, has caused the curvature of the leaf over the feebler white portion.

What is true of the shoots bearing leaves with a white margin is also true of those bearing green-margined leaves. Here the stem may

also have a thick layer of green cells, and in such cases pure green leaves will result.

In dealing with graft hybrids, I pointed out that since the reproductive cells of a plant are usually formed from the second layer of cells, the so-called hypodermis, the offspring of the plant are of the same nature as the tissues forming this layer. The same holds good with the plants with white and green-margined leaves. As these margins represent two layers of cells of stem and leaf respectively, the offspring of flowers which have been self-pollinated are usually entirely white or entirely green, white in the case of plants with white-margined leaves, green in green-margined varieties. The former seedlings, of course, die as they cannot form any nutritive matter.

While the above is the general rule for plants with periclinaly

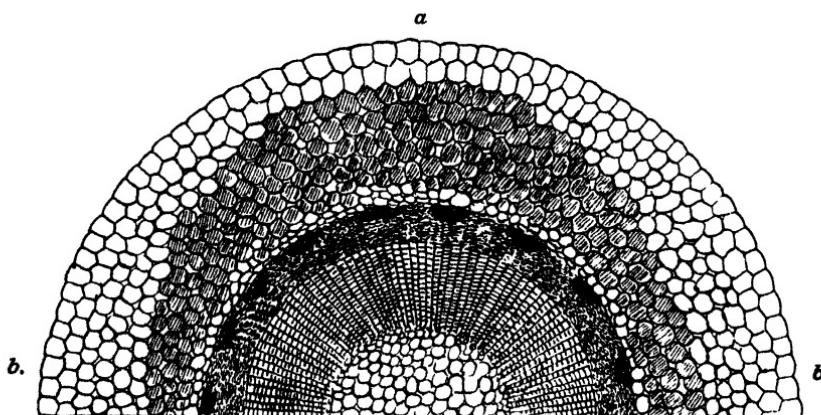


FIG. 65.—SECTION OF THE TWIG OF A HOLLY WITH WHITE-MARGINED LEAVES.

At *a* there are two layers of colourless cells around the green core. Leaves arising from this region will be white margined. Those arising from the twig near *b*, where there are more than two rows of colourless cells, will be white.

variegated foliage, certain abnormalities exist among the garden Geraniums (*Pelargoniums*) which are not clearly understood. Thus green-margined 'Freak of Nature' to which I have referred, although it flowers freely, produces small flowers in which the stamens are aborted and the carpels are very small. Evidently there is some incompatibility between the two tissues. The sporting or reversionary branches, both those which are pure white and those which are pure green, have normal well-formed flowers. We have similar occurrences among the periclinal graft hybrids, DANIEL's *Pirocydonia* being an extreme example. This has as yet never produced flowers. 'Madame Salleron,' a well-known white over green Pelargonium, much grown as a decorative edging plant, has never been known to flower, but when it reverses its tissues and becomes a green over white periclinal it flowers freely, but is devoid of anthers and its carpels are small.

A colour arrangement in flowers, resembling the green and white periclinal chimaeras found in vegetative leaves, is the case of the

Forget-me-Not 'Star of Zürich,' which has a central white stripe in its blue petals, while the converse arrangement occurs in 'Weirleigh Surprise,' in which the margins of the petals are white while each of the five petals has a central blue stripe. R. J. CHITTENDEN, by breeding experiments, has shown that 'Star of Zürich' does not breed true but produces white-flowered offspring. He concludes, therefore, that the flowers have the constitution of a periclinal chimaera with a white core.

In some other cases the periclinal constitution of the flowers cannot be detected by the eye, but can be discovered if they are propagated by root cuttings. When adventitious buds are formed on roots they arise from the inner tissues of the plant and, if these differ in their nature from the outer cells or skin, then the plants will not come true from the cuttings. From time to time it has been stated in the horticultural papers that this is the case with certain Bouvardias which do not always come true from cuttings. The late Dr. BATESON investigated some of these cases with interesting results recorded in the Journal of Genetics. When root cuttings were taken of the double pinkish-white Bouvardia 'Bridesmaid' they invariably produced a scarlet-flowered plant indistinguishable from the form known as 'Hogarth.' We may, therefore, conclude that 'Bridesmaid' arose from 'Hogarth' by a change in the outer tissues only; but how this change took place is still unknown. When the variety 'Hogarth' is propagated from root cuttings it always breeds true to type.

Dr. BATESON also examined some of the fancy Pelargoniums known as 'Regal,' which are semi-doubles with curiously crumpled petals. As mentioned in dealing with variegated plants, crumpling of the leaf occurs not infrequently when the inner green core is cramped by the smaller colourless cells on its exterior. There seemed a likelihood, therefore, that the crumpling of the petals of the Regal Pelargoniums might be due to a similar incompatibility of external and internal tissues of a periclinal chimaera. Root cuttings were taken of 'Escot' which has white flowers with a large purplish-red blotch on each petal, the two dorsal ones of which roll back more or less. The plants produced from the root cutting bore flowers with pink, not white, petals, which, moreover, showed no tendency to curl. The flowers were of a larger size than those of the parent, so evidently in the latter the larger form had been imprisoned in a skin too small for it. Some other white or pinkish-white flowered Pelargoniums of this category behaved in a similar way, their root cuttings producing offspring with more deeply coloured flowers.

Another case in which the chimaera of a plant cannot be detected externally is that of some Potato tubers. A Russian lady, some years ago, by removing the eyes of Potato tubers and thereby inducing adventitious buds to form from internal tissues, demonstrated that a number of varieties commonly grown in Russia were of chimaerical constitution. Mr. W. B. CRANE, of the John Innes Horticultural Institution, adopted this method to investigate the Potato variety 'Golden Wonder' which was distributed in 1906 and which was con-

sidered to have arisen as a somatic variation from the variety 'Langworthy.' In habit of growth, foliage and flowers these two forms are indistinguishable, but the tubers are very different from each other in appearance. Those of 'Golden Wonder' have a thick, brown russet skin, while those of 'Langworthy' have a thin, white, smooth skin. By cutting out the normal eyes from a tuber of 'Golden Wonder' and growing it on with the adventitious buds which arise from the internal tissues, a crop of the original 'Langworthy' variety was produced. The new variety 'Golden Wonder' differs, therefore, only in its skin character and may be considered a periclinal chimaera. Since it probably arose as a sport or mutation, we may infer that such sports may occasionally only affect the external tissues and may, therefore, be considered chimaeral, as the plant retains in its exterior the original characteristics and continues its existence inside a new skin which has a different constitution.

In view of the new facts which show that a somatic change or mutation has taken place in the Potato in the outer layers only, we may conclude that in the case of the Bouvardias and Pelargoniums, with which Dr. BATESON experimented, new varieties had also arisen by mutation of such a partial nature which affected the outer layers of the plants only and so produced periclinal chimaeras.

But while we have gained considerable insight into the general character of chimaeras, whether produced by grafting or by other means, there are still many problems to be solved before our knowledge of these interesting productions is complete.

THE TOMATO AND THE CIGARETTE.

By KENNETH M. SMITH, F.R.S.

Plant Virus Research Station, Cambridge.

MOST gardeners nowadays are aware of the existence of virus diseases and know that some of the most serious disorders of plants are due to the action of these disease agents. Tomato spotted wilt, the virus of which attacks so many ornamental plants as well as the Tomato, is a case in point. There are many other plant viruses which affect Cucumbers, Potatos, Cabbages and so on, and in fact over a hundred separate plant viruses have been described. The point of this short article, however, is to draw the attention of gardeners, and particularly of Tomato growers, to one special group of viruses, and to point out how some of the losses due to these infections can be avoided. The virus of Tobacco mosaic easily infects the Tomato plant and produces the mosaic disease so familiar to all growers of Tomatos. "Stripe" is also due to a virus of this type. Now, the majority of plant viruses are dependent upon a particular insect for transmission from diseased to healthy plants; Tomato spotted wilt virus, for example, is carried by a thrip, and Cucumber mosaic virus by an aphis. The virus with

which we are concerned, however, that of Tobacco mosaic, is not insect transmitted and the chief agent of its dissemination is man himself.

Tobacco mosaic virus exists in a number of closely similar forms or "strains" and the diseases produced in the Tomato plant by these different forms range from a fairly innocuous mottling to a severe disease in which the plant turns yellow and the fruits are misshapen or fail to ripen. This type of virus is very resistant and cannot easily be destroyed; for instance, it requires exposure to a temperature of 200° F. for ten minutes before it is inactivated. Another point about it is its extreme infectiousness; it can easily be transferred from diseased to healthy plants by touching the latter with a contaminated hand or knife.

These few remarks about the properties of Tobacco mosaic virus will perhaps suggest to the reader an important source of infection to the Tomato crop. The commonest host of this virus is the tobacco plant, and since the agent is so resistant to destruction, it remains infective *after* the tobacco plant has been dried and cured. Hence it is still infectious in cigarettes, pipe and chewing tobacco and it is an easy matter to transfer the virus from cigarette to Tomato plant.

During the past few weeks we have received many inquiries at the Virus Research Station from Tomato growers concerning virus diseases of this type. In every case further inquiry has shown that persons in charge of the Tomatos either smoked cigarettes or chewed tobacco *while tending the plants*. In one instance the Tomatos were affected with a very severe disease causing a bright yellow mosaic. At our request a sample of the local cigarettes smoked by the man was sent to us and we had no difficulty in isolating from these cigarettes the same virus as that affecting the Tomato crop.

There is a certain species of Nicotiana, *N. glutinosa*, which reacts to infection with Tobacco mosaic virus with the formation of local spots or "lesions," and this plant is useful in testing for the presence of the virus. In fig. 70 is shown a leaf of *N. glutinosa* which has been rubbed with juice extracted from a packet of cigarettes; the local foci of virus multiplication are clearly shown. Fig. 71 shows a Tomato plant infected by the same means.

What then can be done to avoid this type of infection in the Tomato houses? A few simple rules will reduce the risk to negligible proportions. It is not necessary for all Tomato growers to be non-smokers, but smoking of any sort and tobacco chewing should not be indulged in by persons while tending the Tomato plants. Furthermore, the hands should be carefully washed with soap and hot water before work is commenced in the Tomato houses. It should also be remembered that one plant, if diseased, is sufficient to infect every plant in a house containing several thousand because the virus is so easily spread from plant to plant by the ordinary processes of cultivation.

The Tomato grower who is troubled with mosaic in his plants will find it well worth his while to give the question of smoking in his glasshouses his serious attention.

THE WATER GARDEN.

By FRANCES PERRY.

IT is true that many arts depend to a great extent for their ultimate success on lavish outlay or costly accessories, but great expenditure need not be entailed over the construction of a water garden. Here, given the understanding and the observing eye, the gardener often obtains beauty at less pains than ugliness ; for water does so heighten the charms of the loveliest landscape, and, by reflection, doubles the attractions of the lowliest streamside wildling. The chief snag seems to lie in the individual's rendering of the word "understanding," for time and again one finds small and useless pools built in the most impossible places.

In constructing a water garden one should restrict oneself to natural fitness. The tumbling cascade, the dripping waterfall suggest mountainous or uneven country, but the sluggish stream and broad stretch of water are at one with the flat and undulating ground of the lowland. It would be wrong to imitate artificially such scenes in inappropriate surroundings. At the same time, much can be made of the island feature and an illusion of spaciousness can be created by forming bays or promontories at intervals around the margins. Drift planting with some of the coarser herbaceous bog perennials obscures the water at various points and varies the impressions as one gazes across it. In the larger garden it should never be possible to view the whole broad stretch of water at a glance ; the largest prospect should be towards the house or some other point of vantage, and similarly, views of a river should be directed as much as possible up or down stream and not across it.

Avoid fringing the shore with belts of trees, for they impart to the water a gloomy appearance and cut off the light which is so essential to the welfare of aquatic plants. In autumn, too, the leaves of some sorts falling into the water set up toxic conditions fatal to fish life.

The conventional water garden should never be made in the immediate neighbourhood of fine natural water—be that river, lake or sea. Violations of this rule invariably give bad results. The formal pool should aim at simplicity : it depends less upon the quantity of its horticultural treasures than upon their quality and the suitability of site and surround. It cannot be too strongly stressed that "that odd spot in the garden where nothing else will grow" will *not* do for the water garden.

The circular pool must be in a central position with the ways of approach broad and well defined. It is so obviously an artificial design that one does not seek to disguise the fact, and planting should be restrained and only plants of a purely aquatic nature used. I have

a personal objection to fountains, but they are perhaps less out of place in the round pool than anywhere else. The ceaseless spraying of the water creates pleasing musical cadence, gives a quiet air of activity to the pool and is useful inasmuch as it serves to oxygenate the water. Care must be taken, however, to check their play at eventide (lest the temperature of the water be lowered too drastically), and it is essential that the circumference of the pool be sufficiently wide to catch all the water again. The grass or stone surround must never be allowed to become wet.

Since water gardens came into favour, pools have been made from a variety of materials. In 1731, PHILLIP MILLER wrote in the Gardener's Dictionary : "In some gardens I have seen plants cultivated in large troughs of water, where they flourish very well and annually produce great quantities of flowers, but as the expense is pretty great (their insides requiring to be lined with lead to preserve them) there are few people who can be at that charge." Nowadays we swear by concrete, for it has proved reliable, inexpensive and easily obtainable by most of us. Concrete pools can be made in two ways : they may be either raised or sunken. That is to say, they are either built into the earth so that the top lies flush or just below the level of the ground, or the margins are raised a foot or more above the surroundings. The latter method is employed in those formal gardens which involve the use of straight lines and geometrical patterns, or are of architectural design. They are quite commonly seen, of an oval or rounded shape, set in the midst of a rose garden, framed by an elaborate arrangement of beds or walks. They are more affected by changes in weather conditions than the other sorts and the sides must be made considerably thicker to withstand the extra strain.

The sunken pool lies snug and warm in the earth and its walls can be made thinner, for they receive some support from the ground alongside. They are usually square or oblong, but an informal outline may be readily obtained by constructing a shallow trough margin around the extremities of the pool proper.

In selecting the site for the water garden choose the most open position possible. Water Lilies, and incidentally most aquatics, favour abundant sunshine for maximum growth and tend to bloom much better in such situations. The shelter of trees or shrubs is only permissible towards the north-east, where they serve to protect the pond in winter.

Before commencing operations it is a good plan to mark out the outline with stakes : this gives an accurate idea of the dimensions and acts as a guide during excavation. Take out the soil to a depth of 2 feet 6 inches, thus allowing for 6 inches of concrete, 4 inches of soil and 18 to 20 inches of water—ample depth for most Water Lilies. After excavation—and this is important—the ground must be consolidated to render it capable of supporting the tremendous weight shortly to be imposed upon it. Unless the ground is absolutely firm and level in all parts the chances are that part of the tank will subside



FIG. 66.—*ELEAGNUS PUNGENS*
White skin over a green centre.

(See p. 239).



FIG. 67.—*ELEAGNUS PUNGENS*
Green skin over a white centre.

[Photo, N. K. Goutal.]

[To face p. 246]

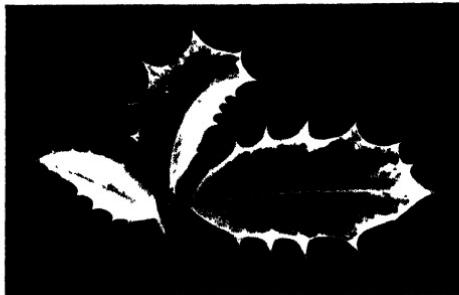


Photo: N. K. Gould.]

FIG. 68.-HOLLY.

The white margined leaf on the right has been produced from the portion of the axis which was covered in by two rows of colourless cells, the white leaf from a portion of the shoot which had a thick covering of white cells. The median leaf has arisen at the junction of the thinner and thicker covering of colourless cells.



Photo: N. K. Gould.]

FIG. 69.-HOLLY.

A shoot showing the nature of the leaves which have arisen from an axis having the character shown in fig. 65. Only the leaves which arise along the line α in fig. 65 are variegated. All the others are white.

(See p. 240.)



FIG. 71.—TOMATO PLANT INFECTED WITH A VIRUS
CAUSING A YELLOW MOSAIC, OBTAINED FROM
A CIGARETTE.



FIG. 70.—LEAF OF *N. glutinosa* WHICH HAS
BEEN RUBBED WITH JUICE EXTRACTED FROM
CIGARETTES. NOTE THE FOCI OF VIRUS
MULTIPLICATION.

(See p. 243)



FIG. 72 - *PONTEDERIA CORDATA*
(See p. 250)



FIG. 73 - *Eriophorum latifolium*
(See p. 249)

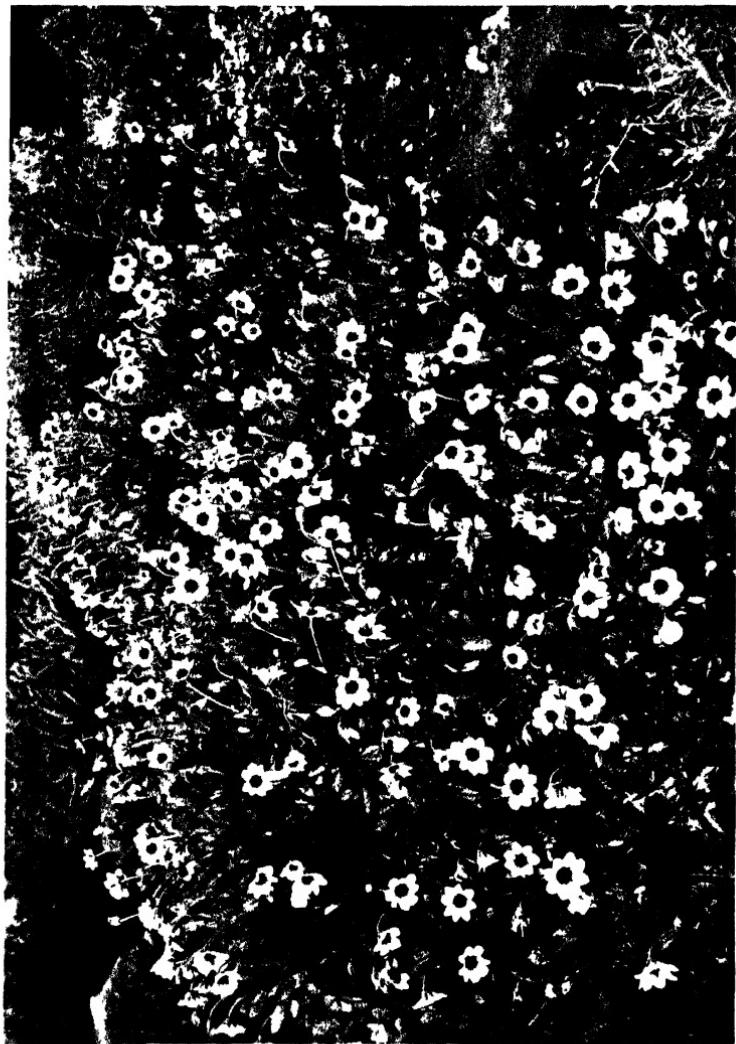


FIG. 74. DRYAS SLENDERMANNII
See p. 230.



Photo: N. K. Gould

Fig. 75.—Tun. Rose Border at Winstley



Photo N. K. Gould

FIG. 76.—HIPS OF *Rosa macrophylla* VAR. KOROLKOWI.
(See p. 254.)

[To face p. 247]

in the loose portion and a leaky tank will result. Clay soils—with their propensities to drying and shrinking during the summer months—must be covered with an inch layer of ashes to prevent the transference of these cracks to the concrete. If the sides are of a loose crumbly nature they can be held in position temporarily by straight boards.

For the actual concreting operations use only the finest materials ; it is poor policy to economize in this respect. Use only the best Portland cement, clean washed river sand and a good quality aggregate (of a size grading from $\frac{1}{4}$ to $\frac{1}{8}$ inch). Use the constituents in the proportions of 1 : 2 : 2 and mix them several times in the dry state before adding water. Make the walls and sides 4 inches thick and the bottom 6 inches thick. The trough margin need only be 10 inches deep with 4-inch sides and bottom.

Once the pond is finished it should be thoroughly tested against leakage, and then some means employed to deal with the poisonous properties which will seep out of the new concrete. There are two methods of setting about this. One consists of applying some substance which will completely seal over the surface—forming a veneer as it were—while the other goes to the root of the trouble itself and aims at counter-acting, with acid chemicals, the alkaline properties as they are emitted. For the first plan there are several proprietary preparations on the market : one of these should be painted over the exposed surfaces according to directions and will completely seal the pores, thus rendering the pool both innocuous and waterproof. For the second method fill the pool with water and stir in sufficient commercial syrupy phosphoric acid to show a slightly acid reaction to litmus paper. The process must be repeated daily until the water remains acid for two successive tests at intervals of twenty-four hours. Incidentally, when the pond is made in the autumn and kept filled with water all winter, it is possible to empty and use it right away for planting in the spring, as by then the water will have absorbed most of the impurities.

The best time for planting the coarse-rooted aquatics (*Nymphaeas*, *Nuphars*, *Aponogeton*, etc.) is in early spring, when the dormant tubers are just starting into growth and the water is becoming warmer. May is generally looked upon as the ideal month for moving Water Lilies, but the season may well be extended for a month either way. The lesser aquatics, submerged oxygenators, etc., can be transplanted right up to early autumn.

A good rich soil is essential for Water Lilies : they need plenty of nourishment to sustain the tremendous amount of growth expended each season. The top spit off pasture land incorporated with one-sixth of its bulk decayed cow-manure, the whole well rotted down for five or six months, makes ideal compost. Cow-manure, however, is not always procurable, but coarse bonemeal makes an admirable substitute (used in the proportions of a six-inch potful to a barrowload of loam). For planting purposes use the soil in a damper condition than is usual for potting, and plant very firmly or the roots may work loose when water is added. In a small pool, where the whole

area is to be thickly planted, it is often the practice to cover the floor with 3 or 4 inches of prepared compost, topping this with 2 inches of screened loam—unadulterated with manure. This is a necessary procedure to prevent any cow-manure from rising to the surface and decomposing, thus fouling the water and poisoning any fish life. The Water Lilies and other aquatics can then be planted into this and the pool *gradually* filled with water. This slow filling of the pool is a great point in the cultivation of the Water Lily. The water must be added gradually, in direct ratio to the growth of the plant, so that it becomes warmed up betweenwhiles and is never so deep as to swamp the young plant. Frequently the filling of the pool—from planting time—covers a period of six to eight weeks.

Another plan is to set the roots in baskets or aquatic pans (with holes bored here and there around the sides), afterwards placing them in the required positions in the pond. This plan finds favour when large areas of water are under consideration or in natural ponds difficult to empty. In time the baskets disintegrate and the Water Lilies root into the natural bottom of the pond. In cases where there is no soil already present the baskets must be renewed every three or four years and the roots divided.

When transplanting, take a good look at the root of the Water Lily before you set it in the soil. It may have a rhizomatous root-stock (like the German Iris), in which case it must be set horizontally under an inch of soil with the crown just exposed. On the other hand, it perhaps belongs to the 'Marliacea' group with a large rounded, Celery-like tuber and fibrous roots; in this case set it vertically up to the crown and spread the roots out well. On receiving a consignment of plants, remove any dead or broken foliage and slightly trim the roots; it frequently happens that the original leaves die off, but this need not give cause for alarm. If planting has been properly done and the water added gradually, new leaves will appear in a few days.

In normal winters, Water Lily roots growing in 12 to 18 inches of water should be quite impervious to frost, but, for the sake of any fish life present, it is as well to break a hole in the ice and keep it open to allow surface absorption of air. The shallow pool, however, may freeze through more quickly, so in very severe weather lay boards across from side to side, covering these with mats or layers of straw. Branches of resinous trees—such as Pine or Fir—also afford good protection, but all covering must be removed directly a thaw sets in or the plants may start into premature growth.

For the average-sized pool (depth of water about 18 inches) an excellent white Water Lily is 'Gonnère'; the double flowers are cup-shaped and sit squat on the water, while the plant is in bloom practically all the summer. Another good white is *N. odorata maxima*, a charming North American variety with medium-sized flowers and a delicious fragrance. *N. Marliacea chromatella* and *Moorei*, with handsome chocolate-mottled foliage and soft canary-yellow blooms,

are old favourites, but their depth of colour is now surpassed by the new American variety 'Sunrise'—the finest yellow Water Lily we have—with rich butter-yellow, star-shaped blooms.

Best and darkest of the reds is 'Escarboucle.' It grows prolifically and bears enormous flowers with star-shaped petals. 'Rose Nymphe' has rich rosy flowers standing several inches out of the water, while *N. odorata* 'Wm. Shaw' is a most desirable variety with pointed rose-pink flowers and orange stamens.

Some of the orange and copper coloured forms are interesting to grow. Among the best are 'Aurora,' with soft rosy-copper blossoms which change with age to orange-salmon; 'Graziella,' very free-flowering with copper-yellow blooms; and 'Paul Hariot,' whose cup-shaped flowers start life canary-yellow, then gradually turn to pink as the blooms mature.

No Lily pool is complete without a number of aquatic plants to clothe its banks and break the formal outline. The planting must not be overdone, however: water plants grow so rapidly as to cover half the pool in a very short time, so only the most ornamental, less robust sorts should be selected for the small pool.

The following list of plants embraces a certain number which come into this category: lack of space forbids adequate descriptions, but all are hardy and easily procurable.

Aponogeton distachyus, Water Hawthorn. Strap-shaped leaves, black-and-white forked flowers. Floating.

Aponogeton leptostachyus (*A. Kraussianus*). Sulphur-yellow flowers standing out of the water.

Butomus umbellatus, Flowering Rush. Pink umbels of flowers, sword-shaped leaves. Height 2 to 4 feet.

Calla palustris, Bog Arum. Of creeping habit, heart-shaped leaves, small, white, arum-like flowers. 9 inches.

Caltha palustris and *palustris plena*. Single and double Marsh Marigolds. Height 9 to 12 inches.

Decodon verticillatus (*Nesaea verticillata*), Water Willow. Shrubby perennial grown for autumnal coloration of the Willow-like leaves.

Dracocephalum palustre. Spikes of pink 'Snapdragon-like' flowers. Height 12 to 15 inches.

Echinodorus ranunculoides. Narrow lanceolate foliage, terminal umbels of three-petalled rosy-lilac flowers. 12 inches.

Eriophorum latifolium, Cotton-grass. Broad grassy foliage, umbels of snow-white cotton-like tufts. 2 feet. (Fig. 73.)

Houttuynia cordata. Spikes of white flowers, heart-shaped leaves. Height 6 to 24 inches.

Hydrocleys Commersonii, Water Poppy. Not always hardy. Thick floating leaves and light yellow Poppy-like flowers standing out of the water.

Menyanthes trifoliata, Bog-Bean. Trifoliate leaves, clusters of pinkish-white fringed flowers. Height 6 inches; creeping habit.

Myosotis palustris. The Water Forget-me-Not, 9 to 12 inches.

Orontium aquaticum, Golden Club. Golden-yellow spadix, silvery-green foliage. 12 to 18 inches.

Peltandra alba, Arrow Arum. White Calla-like flowers succeeded by red berries, arrow-shaped foliage. 8 to 20 inches.

Pontederia cordata, Pickerel Weed. Blue spikes of flowers and heart-shaped leaves. Tidy habit. 18 inches to 2 feet. (Fig. 72.)

Ranunculus Lingua grandiflora, Great Spearwort. Large buttercup-like flowers. Height 2 to 3 feet.

Sagittaria sagittifolia japonica and *japonica flore-pleno*. Single and double white-flowered Arrowheads. Sagittate leaves. Height 12 to 18 inches.

PRESERVING VEGETABLES.

By ALICE CRANG, B.Sc.

THE great increase in the amount of vegetables grown in gardens or allotments, combined with the realization that imported foodstuffs may be increasingly difficult to obtain, has resulted in a general desire to preserve some vegetables at home.

The most important method of obtaining vegetables for winter use is, wherever possible, by carefully selecting varieties and planting them so that they will mature during the winter. This will give a supply of winter greens as well as a number of root vegetables in normal winters.

Another satisfactory method of keeping vegetables for winter use is by various methods of harvesting the crops. For instance, Carrots may be stored quite well in sand or buried in clamps in the ground; Onions may be pulled up, strung together easily by the withering stems and hung up in a dry store. Pods of Haricot Beans or Peas may either be left to dry on the plant or, if the season is wet, whole plants may be dried indoors, and when the pods have withered the shelled beans or peas stored in a dry place. Ripe Marrows will keep for two or three months if hung in nets in a dry shed away from the frost.

Besides these natural methods of preserving vegetables, others are needed for those which either have a short season or else will not keep well by simple methods of harvesting. For these, one rather naturally thinks of the different ways in which fruits can be preserved to see how far these are equally suitable for vegetables. There is, however, one important difference between fruits and vegetables which has to be remembered in several methods of preserving; that is, whereas fruits generally contain considerable amounts of acid, the amount in vegetables, with the exception of Tomatos, is insignificant.

This fact is important when vegetables are preserved by bottling or canning. Fruit bottling is simple because the acid in the fruit, combined with the heat used in cooking or sterilizing, is sufficient to destroy any yeast or mould spores which may be present. Bacteria are also usually fairly easily destroyed by heat in the presence of acid, and if they do survive they seldom thrive in an acid medium.

When vegetables are to be bottled, the difficulties are greater. To begin with vegetables are more likely to come in contact with the soil, and therefore to be infected with soil bacteria, some of which have very heat resistant spores. If the vegetables are bottled in the same way as fruits, some of these bacteria will probably survive, and having plenty of suitable food will multiply rapidly and so cause spoilage.

One apparently obvious method of overcoming this difficulty is to add acid to the vegetables before they are bottled. Vegetables have been bottled in this way to some extent, but too much acid would make the product unpalatable, and until the amount of acid and heat necessary to sterilize the different vegetables can be ascertained, this method cannot be recommended.

A method which has proved commercially very satisfactory is to sterilize the cans or bottles at higher temperatures than can be obtained in water. To do this, steam pressure cookers or autoclaves are used in which steam is generated, and as it is not allowed to escape, high pressures of steam with correspondingly high temperatures are attained. The methods employed can be followed quite successfully at home if a pressure cooker is available. At home 10 lb. steam pressure (240° F.) is usually recommended and the time necessary to heat the bottles or cans of vegetables varies between about 30 to 70 minutes according to the kind of vegetable.

Other forms of preserving are suitable for certain kinds of vegetables. For instance, French or Runner Beans may be put down in jars or crocks with salt, but this method is not generally satisfactory with other types of vegetables.

Drying is another means of preserving suitable for some vegetables. The method giving the best results is to put the vegetables into boiling water for about 2 minutes, drain them well and spread them out on trays, which can be made from wire netting or similar material, covered with butter muslin. Leave the vegetables to dry in a warm place ; if they are dried in an oven, the temperature should not exceed 150° F. When the vegetables are dry, they are allowed to cool before packing into containers and storing in a dry place.

Another form of preserving vegetables worthy of consideration is by making them into pickles or chutneys. These may not have quite so much food value as some other forms of preserves, but if they serve to make other foods more appetising their rôle in war-time diet should not be neglected. Pickles are generally made by leaving the vegetables, cut into suitable sizes, covered with salt for one or two days ; then the excess salt is washed off and the vegetables are put into jars and covered with spiced vinegar. Chutneys are made by cooking suitable fruits and vegetables with salt, spices and vinegar. Sugar normally used in chutneys may largely be replaced by using sweet dried fruits.

Although methods of preserving vegetables are not always as simple as those used for fruits, there is no need for any waste in a well-planned vegetable garden.

SOME PLANTS IN THE SHOW.

May 22, 1940.

MR. C. P. RAFFILL gave an interesting talk upon a number of plants, and the following is a brief résumé of his remarks :

" One of the most outstanding exhibits, in my view, is the marvellous specimen, shown by Mr. G. P. BAKER, Sevenoaks, Kent, of *Calceolaria Darwinii*. This plant is a native of Patagonia, in the south of South America, and the present stock was introduced by Mr. CLARENCE ELLIOTT in 1929 ; it is named after CHARLES DARWIN, one of the greatest of all naturalists. There are a hundred and thirty or more species of this genus, most of which are confined to Western America ; two species, however, are found in New Zealand. *C. Darwinii* is a dwarf plant, 3 to 5 inches in height, which sends up single flowers with large pouches spotted with red. Mr. BAKER's plant bore thirty-eight flowers, but most people are very pleased if they can obtain a dozen on a plant. It is hardy in the west of England and in the south, and is a beautiful plant for the alpine house.

" *Thalictrum psilotifolium* is a very different plant from other members of this genus. It is a distinct and remarkable plant with grass-like leaves, subdivided into long, erect divisions, all of which are branched into threes. The flowers are rose-coloured or pink and remarkably large for this genus, members of which are generally considered as plants for the herbaceous border. This distinct plant was offered for sale by K. WADA of Japan, who has introduced to gardens so many dwarf alpine plants from Japan and Manchuria. He states in his latest catalogue that this plant came from Manchuria, but in my view it is a form of, or closely allied to, *T. foeniculaceum*, which was found in Kansu Province in China.

" Among the numerous exhibits of rock plants one of the most imposing and effective is the fine *Saxifraga longifolia* var. ' Tumbling Waters.' The important thing to remember is to disbud all lateral shoots which form at the base and so throw all nutriment into the main growth.

" *Chenopodium capitatum* is an unusual and pretty plant, the seeds of which were obtained from Tibet. Later in the season the whole plant changes to orange-yellow with scarlet fruits. It is an annual and is cultivated in China as its seeds are useful for oil production.

" Thirty years ago the Curator of the Cambridge Botanic Garden, Mr. LYNCH, received two species of *Gerbera*—*Gerbera Jamesoni* and *G. viridiflora*—from South Africa. One had yellow markings on the back of the flowers and the other violet. By crossing, intercrossing and selection he obtained a race of perennial, single-flowered plants. After a time Messrs. VEITCH acquired a stock of the hybrids and intercrossed them, obtaining flowers of all sorts of colours. Later on

M. ADNET, a Frenchman, started to exploit these hybrids, growing them in fields by the Mediterranean and the gardening journals contained advertisements offering seeds of the 'Adnet hybrids.' Gerberas have proved to be very fine plants for providing cut flowers. In an ordinary room and in fresh water they last a fortnight, which is excellent value for money. They are very popular in the Riviera, where in summer they are grown in fields and in winter in large pots and in glass-houses, for there is a great demand for them. A fine vase of these flowers was shown by Messrs. C. ENGELMANN, Ltd.

"*Iris 'Sierra Blue,'* exhibited by the ORPINGTON NURSERY, is a fine variety raised by the famous American Iris breeder, Professor ESSIG. In 1935 it was awarded the American Dykes Medal for the best new Iris in 1935. It is of a self shade of violet blue, has a good constitution and in my own garden grows to a height of 3½ feet.

"Messrs. BLACKMORE & LANGDON's exhibits of Tuberous Begonias are examples of the wonderful skill of plant breeders. It is interesting to recall that these have all been derived by the intercrossing of five species, collected between 1857 and 1876 by PEARCE and DAVIES for Messrs. VEITCH—*B. boliviensis*, which was introduced in 1857 from Bolivia, *B. Pearcei*, a yellow variety with prominent marbling of the leaves, in 1865 from Bolivia, *B. rosaeflora* and *B. Veitchii* in 1867 from Peru, and *B. Daviesii* in 1876 from Peru. All had small flowers, one was rose-coloured, one yellow and three scarlet, and they were the progenitors of a marvellous race. JOHN SEDEN made the first hybrids for Messrs. VEITCH, and soon they became popular greenhouse plants and other people took up the work of hybridizing.

"*Malus ionensis flore pleno* is at the present time in full flower while most Malus are now over. It makes a nice, small, compact tree and has flowers unlike those of other Apples. The flowers are rose-coloured and deliciously scented. It is a North American tree and has received the Society's Award of Merit.

"On the stand of the STUART Low Co. is one of the few blue Orchids, *Dendrobium Victoriae-Reginae*, although there is a certain amount of magenta in it. It is a native of the Philippine Islands and does not require so much heat as ordinary Dendrobiums—in fact the best way to kill it is to keep it in too high a temperature! I used to grow it successfully among the Odontoglossums, where it thrived very well, increasing in size. There are other blue Orchids—*Vanda coerulea* and *V. coeruleascens* from Burma, *Acacallis cyanea* and *Bollea coelestis* (the latter is a dwarf Orchid with bluish-violet flowers) from Colombia, *Zygopetalum crinitum* and *Z. Mackayi* from Brazil. There are also blue Orchids in Australia, but they are very difficult to cultivate and I have never seen any."

ROSA MACROPHYLLA VAR. *KOROLKOWI*.

IN its several forms the tall and handsome Himalayan *Rosa macrophylla* is well known and often cultivated in British gardens for the beauty of its rose-pink, usually solitary flowers in June and July, succeeded in autumn by bottle-shaped, bristly red fruits lasting until mid-November or even later. There is an immense old specimen plant in Cambridge Botanic Garden, which in 1915 was recorded as over 25 feet in width and is still in existence to-day.

The variety *Korolkowi* is rarely seen, although at least deserving of mention here and certainly of a place in any representative collection of Rose species. Its chief features are the tall, stout, upright stems of purplish-red colouring, bearing very few and scattered light brown thorns, the large leaflets and bracts, pale pink flowers of great size borne on downy and glandular pedicels and very long, bristly vermillion-red fruits containing two or three times as many ovules as the type.

The first mention of the plant appears to be in E. REGEL's *Tentamen Rosarum Monographiae* in 1878, where it was briefly described under the name of *R. cinnamomea* var. *Korolkowi*, and stated by KOROLKOW to have been found in gardens in Khiva, Russian Turkistan. His description would apply perfectly to *R. macrophylla* and does not emphasize the particular points of the variety. REGEL says that the flowers appeared to be double. This has not been confirmed by any subsequent observation which I have traced, nor on a living example.

The next appearance of the name *Korolkowi* seems to be in a paper by M. MAURICE DE VILMORIN, read at the Rose Conference held in London in 1902, and published in the JOURNAL OF THE ROYAL HORTICULTURAL SOCIETY for that year (vol. 27, p. 486). Dealing with variations of *R. macrophylla* he wrote as follows :

" In the collections of M. ALPHONSE LAVALLÉE, under the name of *Rosa Korolkowi*, I found a still taller variety, with large, round, straight, almost thornless shoots, and an ample glossy foliage nearly as large as is found in the Tea-scented Roses. The flower is comparatively large, but the shade is of a lighter pink. The fruit is very large, sometimes 2 inches long. The variety is well worth cultivation."

It should be noted that although it is implied he did not make the combination of *R. macrophylla* var. *Korolkowi*. Also that his description agrees entirely with the plant now in cultivation. This variety is not included either in LAVALLÉE's catalogue of trees and shrubs growing in the arboretum at Segrez (1877), or among the illustrations of woody plants cultivated there which were published in Paris between 1880 and 1885, so that it is difficult to determine the exact date of its introduction to European gardens.

M. DE VILMORIN evidently obtained propagating material from M. LAVALLÉE, since the name is found in *Fruticetum Vilmorinianum*

(1904), the catalogue of the Vilmorin collection of trees and shrubs at Les Barres, written for the first time as *R. macrophylla Korolkowi*, and followed by the words "ex Segrez" which confirms the source.

The next reference is a brief mention by "White Rose" in an article in The Gardeners' Chronicle, Ser. III. 60, p. 27 (1916), accompanied by an illustration of a flower but with no further details or description of the plant.

All other modern works on trees and shrubs seem to omit any reference to it: SCHNEIDER's Illus. Handbuch d. Laubholz. (1904-1912), Miss WILLMOTT's Genus Rosa (1910-1914), BEAN's Trees and Shrubs (1914; 1933), and REHDER's Manual of Trees and Shrubs (1927). The latest I can discover is that of Dr. C. C. HURST in the Rose Annual for 1929 (p. 46). Here it is revealed as a giant tetraploid variety of *R. macrophylla*, possessing a double set of chromosomes, which accounts for the increased size of the parts of the plant as well as the greater number of ovules. It is recorded as growing in the garden of the late Canon CAREW-HUNT at Albury, near Oxford, as well as in the Botanic Gardens at Kew and Cambridge.

There is a good specimen in the National Rose Society's collection at Hayward's Heath, whence the following description and illustration (fig. 76) of the fruits are derived:

A shrub ten feet high or more, extremely upright in habit with few lateral branches; stems stout, smooth, purplish-red, almost without thorns except at the base, or occasionally with a few scattered pairs, slender, light brown, up to $\frac{1}{2}$ inch long with a broad base; young shoots with a thin purplish bloom.

Leaves: stipules large, ovate-oblong, $\frac{3}{4}$ -1 inch long, glandular on back and margin, the tips short and acute; petiole densely pubescent and sparsely glandular; leaflets 9, distinctly stalked, ovate to ovate-oblong, $1\frac{1}{4}$ - $2\frac{1}{2}$ (- $2\frac{1}{2}$) inches long, $\frac{3}{4}$ - $1\frac{1}{2}$ (- $1\frac{1}{2}$) inches wide, smooth on the upper surface, glaucous, glandular, and silky-hairy on the veins beneath, apex acute, base rounded to broadly wedge-shaped, margin crenately serrate.

Flowers: Bracts conspicuous, ovate, gland-edged, about 1 inch long and wide; bracteoles usually two, similar but smaller; pedicels glandular and tomentose, $1\frac{1}{4}$ - $1\frac{1}{2}$ inches long; sepals foliaceous at tip, glandular on back, tomentose on margin; flowers produced at the end of June and early in July, 1-3 on short spurs, about $2\frac{1}{2}$ inches wide, pink; ovary oblong, densely glandular.

Fruit carried on stout pedicels, more or less flask-shaped, tapering slightly at base, $1\frac{1}{4}$ -2 inches long, Vermilion (H.C.C. 18) or Signal Red (H.C.C. 719), glandular-bristly; sepals persistent, upright and connivent, swollen and coloured at base; ovules numbering 28 in one fruit examined, with five more or less ovate, deep cream-coloured seeds $\frac{1}{4}$ - $\frac{1}{2}$ inch long.

LESSONS FROM THE WISLEY FRUIT TRIALS.—III.

YELLOW EDGE OF STRAWBERRIES.

By J. M. S. POTTER, N.D.H., Fruit Trials Officer.

INTRODUCTION.

THE main problems met with in attempting to grow Strawberries at the present time are :

- (1) To obtain a stock of plants free from virus diseases.
- (2) To maintain it in this condition.

These problems are being studied at the Research Stations, and both amateur and professional growers may be interested to hear how the problem is being tackled in the official variety trials at Wisley, and of what results are being achieved.

VIRUS DISEASES.

In view of the uncertainty existing in the mind of the amateur regarding the nature of a virus disease, a simple explanation may be given.

A typical example of a virus disease is 'mosaic' in Tomatos. In this case, if the leaf of an infected plant is examined under the ordinary microscope no trace of any foreign body, fungal or otherwise, can be observed in the plant tissues. Nevertheless, if some sap be taken from this infected plant and inoculated into a healthy plant, the latter will soon show symptoms of the same disease. It is assumed, therefore, that the sap from the diseased plant contains an infective principle, too minute to be visible, which is called a virus.

In nature virus diseases are usually spread from plant to plant through the action of sucking insects (frequently aphides) feeding first on an infected plant and then transferring their attentions to a healthy one, carrying with them the infective virus in their saliva. In the Strawberry virus diseases the insect "vector" is the Strawberry aphid (*Capitophorus fragariae*). It should be noted that every runner produced from an infected plant is itself diseased.

The two best-known virus diseases of this crop are "yellow edge" and "crinkle," brief descriptions of which follow.

YELLOW EDGE.

The best time to examine plants suspected of being infected with "yellow edge" is during August or September, the symptoms being then most pronounced. Infected plants appear dwarfed, with small central leaves, the margins of which are curled and yellow—hence the name "yellow edge." Inside the margin, the leaf blade presents a sickly yellow appearance. The petioles are short, thick, and often

without the normal red colour which is characteristic of some varieties. Plants exhibiting such symptoms as these die out within a few years. Examples of varieties which behave in this way are 'Royal Sovereign' and 'Sir Joseph Paxton.' Unfortunately there are other varieties which, although affected, do not show the characteristic symptoms. Instead the symptoms are usually masked, and the only clue that yellow edge is present is a slow degeneration spread over a period of years, despite every effort by good cultivating to maintain a satisfactory state of vigour. Examples of varieties "masking" their symptoms in this way are 'Tardive de Léopold' and 'Huxley Giant.' Further remarks on these two types of symptoms will be made later.

CRINKLE.

There are two forms of "crinkle," known as "mild" and "severe" crinkle. Mild crinkle is not a particularly serious malady, but it may develop into severe crinkle. The symptoms of the latter disease are that yellow coloured spots, later turning red, and finally brown, appear on the leaves. The young leaves in the crown of the plant are of a sickly hue, and badly infected plants are generally dwarfed. Severe crinkle has not so far become a major disease at Wisley, and losses from it are negligible compared with those resulting from yellow edge.

In attempting to maintain healthy stocks of Strawberries, as free as possible from yellow edge, three lines have been followed : (1) The segregation of varieties highly susceptible to yellow edge from varieties showing marked resistance ; (2) special cultural methods ; (3) the control of aphides.

(1) *Segregation of Varieties.*—It has already been stated that some varieties are susceptible to yellow edge and plainly exhibit the characteristic symptoms. Other varieties do not usually show any visible symptoms, but must be regarded as potential carriers of the disease.

The cultivated Strawberry originated from the crossing of two American species, namely *Fragaria virginiana* and *F. chiloensis*. *Fragaria virginiana* has been found to be highly susceptible to yellow edge with a high capacity for symptom expression, while *F. chiloensis* is a perfect symptomless carrier. The degree of susceptibility, shown by the difference in symptom expression produced by yellow edge on any given variety, has been assumed to depend on whether that particular variety was more closely allied to one or other of its particular parents. It was thought that in those varieties which deteriorated rapidly and exhibited visible symptoms of the disease the *virginiana* "blood" was dominant, and that others which usually exhibited no symptoms of the disease, but could be considered potential carriers, belonged to the *chiloensis* type. On this assumption of parental "blood" it was decided to segregate the varieties into two groups as follows :

Group I, consisting of virus-free stocks of varieties which are seriously damaged by yellow edge and which exhibit definite symptoms when infected. These varieties in general display *F. virginiana* characters, e.g. 'Royal Sovereign.'

Group 2, consisting of varieties which show no marked symptoms of the virus, even when infected, but which are potential carriers. Such portray in some degree the characters of *F. chiloensis*, e.g. 'Huxley Giant.'

These two groups were to be isolated from one another with the object of preventing the disease being transmitted from Group 2 (the potential carriers) to those in Group 1.

On attempting to make a classification by vegetative characters alone it was found that no definite line of demarcation could be found, since many varieties possess characters common to both parental types. A more practical policy was then adopted, of maintaining a close observation on all varieties at Wisley and noting the symptoms exhibited when they became infected with yellow edge. In this way it was possible to make two groups, basing the classification entirely on the symptoms exhibited. Thus Group 1 contains the highly susceptible varieties, that is, those varieties which go down rapidly with yellow edge and exhibit all the characteristic symptoms. Group 2 embraces the "symptomless carriers," that is, varieties which do not usually show any visible symptoms of the disease, and for this reason can be considered symptomless carriers.

The chief difficulty experienced in making this classification lies in the fact that certain varieties are intermediate in their response to infection. For example, 'Oberschlesein' sometimes did, and sometimes did not, produce the yellow edge symptoms. This difficulty was overcome by placing such varieties in the group to which the symptoms of the disease produced under Wisley conditions most closely approximated.

Varieties placed in these two groups are as follow :

<i>Group 1.</i>	<i>Group 2.</i>
'Aromatic.'	'American Seedling.'
'Campbell's Seedling.'	'Corvallis.'
'Redbourn.'	'Duchess of Kent.'
'Royal Sovereign.'	'Ettersberg 121.'
'Sir Joseph Paxton.'	'Huxley Giant.'
Seedling B.K. 4.	'Oberschlesein.'
,, B.K. 46.	'Pillnitz.'
,, B.K. 48.	'Tardive de Léopold.'
,, B.K. 52.	Seedling 17/4.
,, C.C. 44.	,, 10/6.
,, 4/15.	,, 6/B.
,, 5/4.	,, 2/H.
,, 5/11.	,, 6/3.
	,, 9/8.
	,, 9/6.
	,, 3.
	,, 3/A.
	,, 4/I.
	,, 7/10.
	,, 7/5.

These two groups have been isolated from one another, a distance of at least half a mile separating the plots.

Cultural Methods.—When the isolation scheme was put into operation careful consideration was given to stocks for propagation, runners being layered only from vigorous plants which had every appearance of being free from disease. In some cases existing stocks of certain varieties had to be completely destroyed, so badly were they infected, and certain of the present stocks have been increased from a single healthy plant. Thus careful selection was the key-note at the start.

As the plants became older it was observed that an increasing number succumbed to yellow edge—that is to say, from one-year-old or maiden plants only a small percentage had to be rogued, but the percentage of diseased plants among two-year-olds was more than double that of one-year-old plants, and still greater with plants three years of age. It was decided, therefore, to grow the plants for one year only, propagating annually, and destroying the plants after their first year.

For the past three years the procedure here has been to propagate from strong one-year-old plants as soon as picking is finished, restricting each plant to five runners. Early layering gave rise to well-rooted plants which were used to establish a new plantation by the end of August or beginning of September. Planting at this period allows the plants to become established before the winter, and good fruiting crowns are built up for the following year. Anyone who may wish to adopt this method should note that planting must be completed by the beginning of September, otherwise strong fruiting plants will not be obtained for the following summer. Planting distances are 18 inches between the plants and 2 feet between the rows, with the exception of 'Corvallis,' which requires 2 feet by 2 feet 6 inches.

The soil at Wisley, being light and sandy, is anything but an ideal Strawberry soil. To make it retentive of moisture heavy applications of farmyard manure at approximately 60 tons per acre have been given. In early spring a complete fertilizer is applied to the growing plants, which is later supplemented with a mulch of farmyard manure.

Spraying.—As mentioned earlier, yellow edge is transmitted by aphides, the only proven species being *Capitophorus fragariae*, and it is essential to control these pests. The method adopted at Wisley is as follows. At the end of March when the plants are sprayed with lime-sulphur (1 in 30) as a preventive of Strawberry mite, if any aphis are observed, nicotine is added to the lime-sulphur. From this month until the fruit is set, a close observation is kept, and if any aphis are found the plants are immediately sprayed with a standard nicotine wash. It is usually only necessary to spray once during this period, but if this is not effective a second spraying is carried out. After the fruit is gathered, the plants are cleaned of dead foliage and sprayed again prior to layering the runners.

Spraying in all cases must be carried out with high pressure so as to force the wash between the hairs on the leaves and petioles, paying particular attention to the crown of the plant.

Dusting with a nicotine dust (4 per cent.) has also been tried at Wisley, and was successful when the dusting was done during a period of high temperature. If carried out in damp or cold conditions the control was less successful.

By the foregoing procedure of segregation, special cultural methods and spraying, healthy fruitful stocks of all varieties are being successfully maintained at Wisley, a result which could not be achieved when Strawberries were grown in a mixed plantation in the more orthodox way. As all three practices were adopted simultaneously it is impossible to say whether the present success is due to any one practice more than to the others, or whether all three have contributed in part. At all events, from the results obtained it can be suggested to small and private garden owners who have found difficulty in growing the Strawberry owing to virus diseases, that another attempt should be made, by treating the plants as annuals and carrying out the spraying programme recommended. Where space is limited, however, segregation would require to be omitted, but could be obtained by restricting the varieties grown to two of the same group. Two varieties may be required to ensure cross-pollination ; 'Tardive,' for example, is largely self-sterile.

The cost of such a procedure as that adopted at Wisley would prohibit it being put into practice on a commercial scale, and it is to be regretted that nothing has so far been found which would assist the professional grower to grow Strawberries free from virus disease. Observations at Wisley on the varying degree of susceptibility of different varieties to yellow edge would suggest that the solution of this problem lies in the hands of the plant breeder rather than in a policy of isolation. Such varieties as 'Tardive de Léopold,' 'Huxley Giant,' and 'American Seedling' all show a marked degree of resistance, or rather "tolerance," to yellow edge. All these varieties would appear to be related to one another, as all possess a dark green shiny type of foliage, suggesting the predominance of the *chiloensis* parent. The object of the breeder should be to obtain a variety of this type but with a better quality of fruit. The only objection to 'Tardive de Léopold' and the other varieties showing the *chiloensis* blood is the poor flavour of the fruit ; one or two also are self-sterile.

It has been observed that some new varieties, for several years after their introduction to the trials, maintain a marked degree of vigour with apparent resistance to yellow edge disease, despite the absence of treatment other than that carried out under ordinary field conditions. After a varying period of time has elapsed, however, some seedlings suddenly collapse. A typical example of a variety exhibiting such behaviour is 'Western Queen,' which went down very rapidly after four years of apparent resistance. On the other hand, other seedlings, several of which are present in the trials, may continue to exhibit resistance to yellow edge.

BEARDED IRISES AT WISLEY.

THE trial of Bearded Irises at Wisley is being continued on the same lines as in previous years. This report follows the same classification as previous reports, and deals with the awards made in 1939, the acquisition of new varieties to be judged, and those relegated to the General Collection.

The trial is judged by a Joint Committee consisting of representatives of the Royal Horticultural Society and the Iris Society, who also select varieties for trial at Wisley and make their recommendations for awards.

The whole of the trial has been transplanted during the late summer. The name in brackets after the variety indicates the raiser.

Class I.

The following varieties have been added for future judgment: JUNE CRYSTAL (Pesel), KHOOSROO (Baker), ST. VINCENT (Pilkington), WHITE CITY (Murrell).

The following varieties have been relegated to the General Collection: CLODA, MOUNT ATHOS, MY OWN, POLAR KING, SELENE, SKIDDAW.

Class II A a (1).

The following varieties have been added for future judgment: LOS ANGELES (Mohr-Mitchell), MADRIGAL (Murrell), RHEINFELS (Goos & Koenemann).

Class II A b (1).

The following variety has been relegated to the General Collection: CIRRUS.

Class II B.

The following variety has been added for future judgment: CYDALISE (Cayeux).

Class III b.

The following varieties have been added for future judgment: CANTABILE (Williamson), DOROTHY DIETZ (Williamson).

Class IV a.

Blue June (raised by Mr. T. F. Donahue and sent by G. L. Pilkington, Esq., Woolton, Liverpool). **A.M.** June 9, 1939.—Of vigorous growth and rapid increase with erect glaucous-green foliage, 26 inches high. Flower stems 42 inches high, erect, straight, 8-flowered. Flowers large, well proportioned, stiff. Standards cupped, $3 \times 2\frac{1}{2}$ inches, clear lavender. Falls drooping, $2\frac{1}{2} \times 2\frac{1}{2}$ inches, lavender-violet, veined brownish at haft. Beard orange. Flowering for fourteen days from June 1.

The following varieties have been added for future judgment: BANNERET (Murrell), PRAESEPAE (Bunyard).

The following varieties have been relegated to the General Collection: AZIADAE, CYDNUSS, IZAR, KAMET, THUBAN.

Class IV b.

Brahmin (raised and sent by the Rev. Canon Rollo Meyer, Little Gaddesden, Berkhamsted, Herts). **A.M.** June 9, 1939.—Vigorous and of rapid increase, with erect, glaucous-green foliage, 22 inches high. Flower stems 36 inches high, erect, straight, 8-flowered. Flowers large, stiff, well proportioned. Standards domed, $2\frac{1}{2} \times 2\frac{1}{2}$ inches, clear, rich blue-purple. Falls drooping, $2\frac{1}{2} \times 2\frac{1}{2}$ inches, deep, rich velvety violet-purple. Beard blue. Flowering for twelve days from June 6.

The following varieties have been added for future judgment : **CONQUISTADOR** (Mohr), **CORONACH** (Barr), **DARIEL** (Baker), **FANFARE** (Barr), **LEGEND** (Wareham).

The following varieties have been relegated to the General Collection : **BLUE VELVET**, **CENTAURI**, **GENTIUS**, **KAFFIR**, **PALARMON**, **SANTA CLAUS**, **VELVET KING**.

Class IV c.

The following varieties have been added for future judgment : **INDIAN CHIEF** (Ayles), **SWEET PEA** (Murrell).

The following varieties have been relegated to the General Collection : **FRIEDA MOHR**, **PINK LOTUS**, **RENÉ CAYEUX**, **ROSE DOMINION**, **ROTA**.

Class IV d.

Ruahine (raised by Mrs. W. R. Stevens and sent by G. L. Pilkington, Esq.). **A.M.** June 9, 1939.—Vigorous and of rapid increase, with erect, glaucous-green foliage, 24 inches high. Flower stems 40 inches high, erect, zigzagged, 8-flowered. Flowers large, stiff, well proportioned. Standards domed, $2\frac{1}{4} \times 2\frac{1}{4}$ inches, bright wine-purple. Falls drooping, $2\frac{1}{2} \times 2\frac{1}{2}$ inches, bright reddish wine-purple. Beard dull yellow. Flowering for fourteen days from June 6. ('Alcazar' x 'Ballerine'.)

The following varieties have been added for future judgment : **CARFAX** (Bliss), **MINISTRE FERNARD DAVID** (Cayeux), **MODOC** (Essig), **SENlac** (Bliss), **UKIAH** (Essig).

The following varieties have been relegated to the General Collection : **CHANCELLOR**, **CHALLENGER**.

Class V a.

The following varieties have been added for future judgment : **BLUE SENTINEL** (Pesel), **LADY PHYLLIS** (Neel), **PAULETTE** (Millet), **RIALTO** (Bliss).

The following varieties have been relegated to the General Collection : **LADY LOU**, **VIVIEN**, **WYNN HELLINGS**.

Class V b.

Calixa (raised and sent by the late Mrs. W. R. Dykes). **A.M.** June 9, 1939. Plant vigorous and of rapid increase, with erect, glaucous-green foliage, 20 inches high. Flowers large, stiff and well proportioned. Standards domed, $2\frac{1}{4} \times 2\frac{1}{4}$ inches, clear rich lavender. Falls straight-hanging, $2\frac{1}{2} \times 2\frac{1}{2}$ inches, clear rich lavender. Beard white, tips of hairs yellow. Flowering for nineteen days from May 26.

The following varieties have been added for future judgment : **BLACK DOUGLAS** (Sass), **CINNABAR** (Williamson), **MISSOURI** (Grintner), **SHINING WATERS** (Essig), **SIERRA BLUE** (Essig), **WACONDA** (Sass).

The following varieties have been relegated to the General Collection : **BUNNY**, **GOLDCREST**, **MYDDLETON BLUE**, **NEMO**, **SAN DIEGO**, **TASMAN**.

Class V c.

The following varieties have been added for future judgment: ANTEROS (Spender), CHARMEUR (Cayeux), PAGEANT (Murrell).

The following varieties have been relegated to the General Collection: NOURA, ROSE PETAL.

Class VI a (1).

The following varieties have been added for future judgment: EVOLUTION (Cayeux), PRESIDENT PILKINGTON (Cayeux).

The following variety has been relegated to the General Collection: NINGALL.

Class VI a (2).

The following varieties have been added for future judgment: ALASTOR (Spender), ANTIGUA (Pilkington), EROS (Mead), FULGORE (Cayeux), LILIAS (Murrell), MAYFAIR (Murrell), ROSANNAH (Murrell), SPRING MAID (Loomis).

The following variety has been relegated to the General Collection: SANDIA.

Class VI b.

The following variety has been relegated to the General Collection: PRINCE TIKHA.

Class VI c (1).

Cheerie (raised by Dr. W. McL. Ayres, introduced by Mrs. D. Pattison and sent by G. L. Pilkington, Esq.). A.M. June 9, 1939.—Vigorous and of rapid increase, with erect, glaucous-green foliage, 24 inches high. Flower stems 42 inches high, erect, straight, 8-flowered. Flowers large, stiff, well proportioned. Standards domed, $3\frac{1}{2} \times 2\frac{1}{2}$ inches, bright clear wine-purple, base orange. Falls straight-hanging, $2\frac{1}{2} \times 2\frac{1}{2}$ inches, waved, rich velvety reddish-purple. Beard rich orange. Flowering for sixteen days from May 30.

Melchior (raised and sent by Messrs. R. Wallace, Tunbridge Wells). A.M. June 9, 1939.—Vigorous and of rapid increase, with erect, glaucous-green foliage, 24 inches high. Flower stems 36 inches high, erect, zigzagged, 8-flowered. Flowers large, well proportioned, stiff. Standards domed, $2\frac{1}{2} \times 2\frac{1}{2}$ inches, dull deep smoky plum-purple. Falls drooping, $2\frac{1}{2} \times 2\frac{1}{2}$ inches, rich velvety wine-purple, veins brownish on haft. Beard orange. Flowering for thirteen days from June 3.

The following varieties have been added for future judgment: COPPERSMITH (Shull), CRESSET (Bliss), HESTER PRYNNE (Bliss), KING TUT (Sass), MARÉCHAL NEY (Williamson).

The following varieties have been relegated to the General Collection: BLENHEIM, IRAN, ROSE ASH.

Class VI c (2).

Pleador (raised by Mr. B. Y. Morrison, introduced by the Glen Road Iris Gardens and sent by Mrs. E. A. S. Peckham, New Rochelle, U.S.A.). A.M. June, 1939.—Vigorous and of rapid increase, with erect, glaucous-green foliage, 28 inches high. Flower stems 40 inches high, erect, straight, 8-to 10-flowered. Flowers extra large, stiff, well proportioned. Standards cupped, $3 \times 2\frac{1}{2}$ inches, dull smoky old-gold with a reddish

sheen. Falls straight-hanging, $2\frac{1}{2} \times 2\frac{1}{2}$ inches, rich reddish-brown on a yellow ground, margins paler. Beard bright orange. Flowering for fourteen days from June 6.

The following varieties have been relegated to the General Collection : FRA ANGELICO, M.I.O.C., NANNETTE, ORIENT PEARL.

Class VII d.

The following varieties have been added for future judgment : BEAU SABREUR (Williamson), GAY GIRL (Murrell), REGENCY (Murrell), TOPHET (Peckham), TORCHLIGHT (Murrell).

The following variety has been relegated to the General Collection : BANDEROLE.

Class VIII a.

Golden Hind (raised and sent by Mr. H. Chadburn, Saxmundham, Suffolk). F.C.C. June 9, 1939. Described R.H.S. JOURNAL, 62, 131. (A.M. 1936.)

The following varieties have been added for future judgment : ALTA CALIFORNIA (Mitchell), CALIFORNIA GOLD (Mitchell), GIBRALTAR (Pilkington), JOAN LAY (Chadburn), MABEL CHADBURN (Chadburn), SAHARA (Pilkington).

The following varieties have been relegated to the General Collection : ADEN, GOLD COAST.

Class VIII b.

The following varieties have been added for future judgment : ALICE HARDING (Cayeux), G. P. BAKER (Perry), GOLDVLISS (Goos and Koenemann), KING JUBA (Sass).

The following varieties have been relegated to the General Collection : FLAVILLA, KENYA.

Unclassified Varieties.

The following varieties have been added for future judgment : BRENGWAIN (Barr), CAIRNGORM (Burton), HENRY HAWKEY (Collett), IRMA POLLOCK (Sass), JEAN CAYEUX (Cayeux), MAURITIUS (Pilkington), RAMSES (Sass), ROSY WINGS (Gage), SARAH (Stern), SERENITE (Cayeux), SHEPHERD'S WARNING (Pesel), SICILIAN GOLD (Burton), SILVANUS ('age), SIMPLEX MUNDITIS (White), THURETUS (Sass), WATERMEADS (Pesel).

BOOK REVIEWS.

"Soilless Culture Simplified." By Alex Laurie. 8vo. xiii + 201 pp. (McGraw-Hill Publishing Co., Ltd., London, 1940.) 12s. 6d.

This is another book on the growth of plants by pure chemical nutrients in solution in water, the water being contained in tanks, or beds of gravel or sand, written by the Professor of Floriculture in the Ohio State University.

The commercial development of the method is comparatively recent, so that every year sees new adjustments and contrivances for making it more workable and economic. Professor Laurie's book contains a number of suggestions which will be found valuable by either the amateur interested in trying water cultures on a small scale, or by the commercial grower under glass who may be tempted by certain features of great promise in the new method. Professor Laurie deals with a wide range of plants; unfortunately the varieties are American and little known here, at any rate under the names used.

The book does not treat only of water cultures; there are some useful chapters on artificial fertilisers in the commercial garden and a very valuable chapter on the symptoms indicative of deficiency of the soil in particular constituents of plant food, including those secondary elements in nutrition like manganese or magnesium or boron, the need for which we have only recently begun to learn.

"The Genus *Tulipa*." By Sir Daniel Hall, K.C.B., LL.D., D.Sc., F.R.S., V.M.H. vii + 171 pp., with 40 illustrations in colour and 23 figures in black and white. (Royal Horticultural Society, London, 1940.) £1 1s.

For many years Sir Daniel Hall has taken a keen interest in Tulips, and he has already written a general account of the genus, which was published in 1929 under the title of *The Book of the Tulip*. For the past thirteen years Sir Daniel has made a close study of the collection of Tulip species in cultivation at the John Innes Horticultural Institution; from time to time he has written articles on various aspects of his investigations, and now, in his latest contribution, published in book form by the Royal Horticultural Society, he gives a comprehensive account of his work.

The book does not profess to be a monograph of the genus, and no attempt has been made to revise all the species critically. As Sir Daniel says, the book "represents materials for a review of the genus rather than a monograph," and it is primarily an account of the species in cultivation based on first-hand observations of the living plants. The book amply justifies the claim put forward for it, that "it brings together a good deal of evidence hitherto unavailable and often significant in determining the relationships between the various species." The first chapter is a concise account of the history and distribution of the genus, and is followed by an excellent chapter on general morphology, including some most interesting information about the pigments found in the plants. As might be expected, particular attention has been paid to cytology and its bearing on taxonomy, and a chapter is devoted to this subject. This is followed by a chapter on taxonomy in which the value of various diagnostic characters is discussed, and a brief account is given of the main subdivisions of the genus; after this comes a key to the species described in the book. The greater part of the text is occupied by the descriptions and notes of the species in cultivation, seventy-four in all,* two of them new and described here for the first time. The species dealt with are not all of equal value, and some might, with equal propriety, be treated as subspecies or varieties. Binomials have, however, been retained for all the groups, and those of more doubtful specific status are referred to as "subsidiary species"; a number of these, the derived polyploids in addition to the diploids, together constituting the species *sensu lato*. Subsidiary species are not recognised in current botanical nomenclature, but in this case there need be no difficulty, for as binomials are used and the groups are generally referred to as species, they can be treated as such in the usual way, though it is a little unfortunate that *T. Grisebachiana* and *T. patens* are referred to as subspecies. Taxonomically *Tulipa* is a difficult genus, partly owing to our lack of knowledge about the limits of variation of the individual species, and partly because so many species have been described from imperfect material, and the identification of material is often unsatisfactory. The difficulties are stressed many times in this book, and this focussing of attention upon the lacunae in our knowledge of the genus is one of the useful functions it performs.

The book is excellently produced and is well illustrated, having sixteen photographs and seven line-drawings in addition to the forty coloured plates. The latter are produced photographically, and though they suffer from the limitations of the process, they are good and should prove very useful. To the horticulturist the work will be of value in the same way as Bean's *Trees and Shrubs*, for in addition to the descriptions and taxonomic notes, there are remarks on the behaviour and garden value of the species. The fact that the book is almost entirely a record of original observations renders it a mine of information for students of the genus, and for those concerned with taxonomy it should prove of the greatest assistance, the more so since specimens of all the species described have been deposited in the Kew Herbarium.

J. R. S.

John Innes Leaflets, Nos. 1, 2 and 3.

These leaflets contain a series of working instructions for the practical gardener which summarize the long and rigorous experiments of Messrs. Lawrence and Newell on the preparation of composts for seed sowing and indoor cultivation, and on the sterilization of the soil.

Some years ago the John Innes Institution thought it advisable to sterilize the composts they had long been working with, composts made up in the traditional way from loam and sand with leaf mould and mortar rubble. However, the usual methods of sterilization then in vogue led to irregular and unsatisfactory

* Of these two are referred to a distinct genus, *Amana*.

results, especially in the germination of particular seeds. Mr. Lawrence then embarked upon a long series of experiments, testing each ingredient of the compost in turn and varying quantities and conditions in the most exhaustive fashion. The heating process, especially if the temperature is raised to boiling point and prolonged, breaks down the organic matter of the loam, leaf mould or peat employed, into compounds which are detrimental to germination and the early growth of the plant; again, the texture of the soil is changed. These difficulties were overcome and the outcome is a prescription for two standard composts, one for seed sowing, the second for pots, in which growth is at an optimum as regards vigour and freedom from disease. No more than these two mixtures are needed for all classes of plants; they have now been tried by professional growers all over the country with the best possible results.

The make-up of these composts is described in Leaflet No. 1, price 3d., post free, from the John Innes Institution. The second leaflet, also price 3d., discusses the sterilization process and the various types of apparatus for carrying it out. Of course "sterilization" is a misnomer; the destruction of soil organisms is only partial, indeed it is better if the temperature does not exceed 200° F.—it is more akin to the process called "pasteurisation" with milk.

In dealing with small lots of soil, apparatus may be improvised or there are outfitts on the market. Small sterilizers using electric current are also obtainable. At the John Innes itself, where large quantities are required, the heating is by steam from a high-pressure boiler, which itself may cost £80 to £100. For smaller establishments Mr. Lawrence has now worked out the design for an outfit capable of dealing with a cubic yard of soil in about an hour. The design is again the outcome of a series of experiments and every detail of the materials and construction has been thoroughly tested. The materials are easily obtainable, at a total cost of under £20, and the work can be done by any handy man who can handle bricks and cement. In Leaflet No. 3, price 6d., the construction of such a sterilizer is described step by step; it will be an invaluable adjunct to every small nursery.

"The Scientific Principles of Plant Protection with Special Reference to Chemical Control." By Hubert Martin. 8vo. x + 385 pp. (Edward Arnold & Co., London, 1940.) Price 22s. 6d.

This well-known book has now reached a third edition, incorporating the recent research of the last four or five years. It is not a book for the practical gardener but for the mycologist or entomologist who is looking for principles to govern his methods of dealing with the diseases of plants.

The subject of plant protection is dealt with systematically, one might say philosophically, in the earlier part of the book, for there the nature of plant resistance and the relative value of control methods are discussed. One may combat disease by improving the environment—by varying the temperature or humidity for example—or by the selection and breeding of resistant varieties, ultimately the most economic method. Alternatively one must resort to direct attacks, such as biological control by insects that prey upon the pest, or by trapping, or more generally by the application of fungicides and insecticides—spraying and dusting. Here again the subject is approached methodically, not by reference to plant or disease. For example, one section of a chapter is devoted to sulphur, to the various forms and compounds of sulphur which are used as insecticides, and their mode of action. The reader must not expect to find instructions about the preparation of a lime-sulphur wash and its use to combat scab in Apples, but he will find a discussion of its composition, of the way it acts upon the fungi, and again of its effect upon the plants on which it is used. The ample references that are supplied will direct the reader to directions for its practical application as a spray.

Similar treatment is accorded to the copper fungicides—Bordeaux mixture in its various forms, the parallel Burgundy mixture, Cheshunt compound, and a variety of sprays and powders which are mostly proprietary products.

Finally the book directs attention to the hygiene of the plantation or garden, to the necessity of removal of sources of infection and alternative host plants which will maintain the existence of the pest. Other precautions again will eliminate or minimize the insect vectors which carry the virus diseases from plant to plant.

Dr. Martin's book has now an established reputation; it is indispensable to the worker in plant pathology.

JOURNAL OF THE ROYAL HORTICULTURAL SOCIETY



Vol. LXV

Part 9



September 1940

THE SECRETARY'S PAGE.

RED CROSS SALE, SEPTEMBER 24, 25 AND 26, 1940.

ATTENTION is drawn to the advertisement of the Red Cross Sale on the inside cover page of this number giving the particulars of the times at which the sale is to be held. The sale will last three days and will be divided between two Sale-rooms: in Sale-room A, plants, shrubs, bulbs, horticultural accessories, etc., will be sold, and in Sale-room B Orchids, books, pictures and coloured prints.

The number of lots of plants, etc., will be about 2,250, Orchids 374, and books 720.

Two further notices will be found in this number of the JOURNAL regarding the sale, giving interesting particulars, one on the books and the other on the plants and horticultural accessories.

The support of generous donors of gifts for the sale has been extremely satisfactory, and the donors are thanked for their generosity; the support has been such that arrangements are now being made to hold a second sale in Birmingham on October 10 and 11, where the City Corporation is kindly placing at the disposal of the Society accommodation for the sale in the Town Hall. Besides this a third sale will be organized it is hoped at Manchester.

The catalogue of the London sale, with its attractive cover by Mr. OLIVER MESSEL, is now obtainable. It costs 2s. 6d. post free, and the proceeds of its sale will go to swell the Red Cross Fund. Special catalogues will be published for the provincial sales.

It is pointed out, especially with regard to the plants, etc., that in view of the welcome necessity of holding more than one sale, many of the offers of gifts have been divided up over the two or three sales,

so that when the London catalogue is read it must not be thought that gifts which have been accepted are not included but that they have been divided over the three sales.

LECTURE PROGRAMMES FOR THE AUTUMN AND WINTER.

It is gratifying to report that numerous applications have been received for lectures for the autumn and winter months on food production, and Fellows are again reminded of the service of the lecture panel organized by the Society together with the Ministry of Agriculture and Fisheries. It is hoped that most of these lectures will now be illustrated by slides, which have been specially made during the whole of the growing season so that the operations of growing and harvesting vegetables may be illustrated in pictures on the screen. These lectures should be of particular value to the many beginners who have been growing vegetables for the first time, and will give them an opportunity to learn how to rectify the mistakes that they have made in their first year of gardening.

The lecturers and demonstrators give their services free and only the cost of their out-of-pocket expenses has to be met. All applications should be addressed to The Secretary, Royal Horticultural Society, Vincent Square, Westminster, S.W. 1, giving the time, date and location of the lecture or demonstration.

Do not forget that the cultivation of vegetables is a matter of national importance. Improved cultivation saves seeds and eliminates wasteful production.

ADVICE ON TECHNICAL SUBJECTS.

All requests for horticultural advice, advice on diseases, soils and manures, and for the identification of plants, should be addressed to The Director of the R.H.S. Gardens, Wisley, near Ripley, Surrey. All fruits for naming should also be sent to the Director of the Society's Gardens at Wisley, and not, as has been formerly the practice, to the Society's Offices in London. Fellows and Associates are reminded of the following rules for sending plants or fruits for identification.

(1) Send a good strong piece, bearing leaves and at least three blossoms. Cut the flowers in the bud stage or they will be over before they arrive. It is rarely possible and never wise to name a plant from its leaf alone, and poor specimens with only one blossom make identification unnecessarily difficult.

(2) Wrap in soft paper and then pack in moss or even damp grass. Do not use cotton-wool. Specimens should not be pressed.

(3) Give all the information you can respecting the specimens, including the size of the plant and the country of origin, or natural habitat, if known. With a garden plant, say where it is growing, greenhouse or open, sun or shade, etc.

(4) Of fruits, send at least three perfect specimens of a variety. Do not send until fruits are mature, and then choose specimens representative of the particular variety. Avoid sending bruised, diseased

or abnormal fruits. Include with each variety a typical shoot with foliage. In the case of Apples and Pears number each variety, preferably in Roman figures, by marking the skin with a hard pencil, and keep a record of the tree from which it is gathered. Labels are often displaced during transit. Wrap each fruit in paper and pack it carefully and securely in wood-wool or similar material. Cardboard boxes are usually crushed in the post, while scented soap boxes taint the fruit and obscure the characteristic flavour. Give all the information you can respecting the age of the trees and how they are grown, e.g. indoors or out, as cordons, bushes or standards, etc.

AGRICULTURAL WAGES.

With regard to the new agricultural rate which came into force on June 30, persons who employ gardeners and who are in doubt whether their employees come under the Act or not should make inquiries at the Ministry of Agriculture and Fisheries, King's Buildings, Dean Stanley Street, Westminster, S.W. 1. The new rates make no change in the definition of an agricultural labourer. The Society understands that persons engaged upon work in private gardens are not employed in agriculture within the meaning of the Agricultural Wages Regulation Act, 1924, unless the garden is engaged mainly in vegetable production. Employment in agriculture is defined in the Act as including employment in connection with the use of land as orchard land, market gardens or nursery grounds.

SEED SAVING.

Fellows, Associates and Affiliated Societies are reminded of the importance of saving such vegetable seeds as they can. This applies especially to Peas and Beans at the present moment. It would be a wise precaution to select a few good specimens of Carrots, Onions, Parsnips and Beetroot as they mature to place in store for planting out in spring to produce a crop of seeds in 1941.

TRIAL OF GARDEN PINKS.

It is desired to establish at Wisley a standard collection of Garden Pinks and their hybrids and to conduct trials of new varieties.

Fellows who desire to submit varieties to the Gardens at Wisley for the standard collection and for trial are asked to send five plants of each variety and to submit the list of names they desire to enter for trial to the Director of the Gardens at Wisley. These plants and lists should be sent any time between the months of September and March. The adjudication will be done by a Joint Committee of the Royal Horticultural Society and the National Border Carnation and Picotee Society.

PUBLICATIONS.

The recent pamphlet issued by the Society, and approved by the Ministry of Agriculture and Fisheries and the Ministry of Food, entitled "Simple Vegetable Cooking" has met with a very ready response, and

the Society has been congratulated on its simplicity and utility. Copies may be had on application to the Secretary, price 4*½*d. post free.

"The Genus Tulipa" has now been published and is receiving very favourable and congratulatory reviews on all sides. This publication is likewise obtainable on direct application to the Secretary, price £1 2s. post free.

WISLEY IN SEPTEMBER.

In this, the first month of autumn, the visitor will find the most interesting and colourful features in the herbaceous border, among the shrubs and Heaths in Seven Acres and Howard's Field, in the Rock Garden where the late Gentians are in full bloom, as well as in the Azalea garden adjacent to the path leading towards Seven Acres. By first proceeding to the Rock Garden, thence through the Wild Garden to Seven Acres, and if time permits to Howard's Field, returning by the herbaceous border and Azalea Garden, all these principal points may conveniently be seen.

Close to the entrance gates, beneath the south wall of the laboratory, is a group of the handsome pink *Amaryllis Belladonna* which enjoys such a site and flowers regularly each autumn, as does the yellow, Crocus-like *Sternbergia*. Round the corner of the wall are *Rosa bracteata* with large single white flowers, neighboured by its well-known offspring 'Mermaid,' both of which came safely through the severe winter.

Among the trials and standard collections varieties of the useful *Aster Amellus*, in tones of blue or pink, as well as all the numerous Michaelmas Daisies, are in flower this month for a period of several weeks. So also are the hardy border Chrysanthemums which now offer such a great variety in colour, size of flower, and variation in habit that every garden should be provided with some of them for the autumn months. Near these are the Dahlias, in their accustomed place on either side of the long grass walk leading up to the slopes of Battleston Hill. The varieties of *Lobelia fulgens* are also likely to be still worth notice in at least the earlier part of the month, and can be found close beside the path near the fruit store. The way to the Alpine house and Rock Garden along King's Avenue will give an opportunity to see how the Roses are faring and which are the best at this season of the year. There may also be some annual plants worth noting, even at this late date, in the long borders opposite the Pear orchard.

Although the Alpine house is by no means now at its best there are still some uncommon or beautiful plants to be seen there. They will probably include several species of *Campanula* such as *C. Tymonsii* and *C. cashmiriana*, of *Amaracus* (*Origanum*) with downy foliage and nodding purplish flowers, the white-flowered *Gentiana saxosa* from New Zealand, the slender pink *Limonium (Statice) ornatum*, *Nertera*

depressa with its bright orange, stemless berries, and the small white cups of *Oxalis magellanica*.

The brightest plants in the rock garden will be the autumnal species of Gentian, which include *G. Farreri*, *G. gracilipes*, *G. ornata*, and most brilliant of all, *G. sino-ornata*, growing in broad patches and opening its deep, pure blue flowers to the sunshine. On an eminence the light scarlet flowers of *Zauschneria californica* are prominent while the fiery *Verbena chamaedryfolia* will not be overlooked. The Periwinkle-like, blue or purple flowers of the Himalayan *Cyananthus*, of which *C. insignis* and *C. microphyllus* are good examples, can be seen in damp places near the upper path, and here too are the attractive bowl-shaped light blue flowers of *Geranium Wallichianum* 'Buxton's variety,' the curious *Roscoea purpurea* var. *pallida*, the pink or reddish spikes of the creeping species of *Polygonum*, and the white, fringed flowers of an Asiatic *Parnassia*, *P. nubicola*. The large bush of *Abelia grandiflora* on the lower slope above the Bog Garden is usually most conspicuous just now for its multitudes of small tubular, pink flowers, and another excellent and fragrant shrub for late summer and early autumn is *Clethra alnifolia*, of which an old specimen is growing in the middle of the Alpine meadow.

Continuing into the Wild Garden we note the arched spikes of the Willow Gentian, *Gentiana asclepiadea*, having either blue or white bells, the tall stems of the latest Lilies, particularly *L. superbum* which enjoys a wet position in acid soil, *L. speciosum*, and the orange *L. Henryi*. *Cyclamen neapolitanum* is coming up beneath some of the trees, producing rosy or white flowers before the foliage appears. An uncommon woodland shrub is *Cyrilla racemiflora*, the Leatherwood of the eastern U.S.A.; this bears many slender tassels of white flowers over a considerable period and reaches a height of five or six feet. Several *Hydrangea* species are also most useful and decorative at this time, especially perhaps a rich blue form of *H. macrophylla* (*opuloides*) and the cream-coloured heavy heads of *H. paniculata* var. *grandiflora*.

Except for the Buddleias—*B. Fallowiana*, *B. Davidi* and its forms, and the hybrid *B. Weyeriana*, with some Hypericums such as *H. prolificum*—not many shrubs are still flowering in Seven Acres, but colour is found in the berries and foliage of others now taking on their autumn tints. In the former group the Berberis and Cotoneasters are the principal performers, followed by the Crab-Apples such as *Malus baccata* and the bushy *M. Sargentii*. For coloured leaves *Acer circinatum*, *Prunus Sargentii*, *Ribes aureum*, and several species of *Euonymus* are outstanding, especially *E. Bungeanus* and *E. verrucosus*.

In the Heath garden various forms of the Cornish Heath, *Erica vagans*, of the Common Ling, *Calluna vulgaris*, with its beautiful double variety known as 'H. E. Beale,' and the Corsican Heath, *Erica terminalis*, are in bloom and form large patches of colour at the present time. The Connemara Heath, *Daboecia polifolia*, having been severely cut back by the past winter, will not flower until next year.

By walking along the path near the river bank those who pay

a visit to Howard's Field will come to the Rosa species and find many of them bearing ripe or coloured fruits, and will be able to gain an idea of the best kinds for ornamental value in autumn. In September these include *R. Moyesii*, *R. Sweginzowii*, *R. oxyodon*, and *R. Davidi*, all with red or scarlet bottle-shaped hips, while the large rounded ones of *R. rugosa* and the bristly fruits of *R. villosa (pomifera)* are equally striking and decorative.

From Howard's Field it is only a short walk across the road to the vegetable trials and demonstration plot situated behind the village of Wisley. Besides a collection of up-to-date varieties of vegetables the following trials will be mature, or nearly so, and ready for inspection by all those interested this month : Carrots, Haricot Beans, Kales and Onions. Close at hand are the National Fruit Trials, where the Plum trees this year are breaking down with the weight of the crop.

The demonstration plot is designed to show the proper methods of cultivation and the arrangement of successional crops of vegetables suitable for small gardens. These now include Celery, Runner Beans, Onions, root crops such as Carrots and Parsnips, and members of the Brassica family—Cabbages, Kales, Brussels Sprouts, etc.—indispensable for the winter months.

Returning through the Pinetum and turning to the left we come to the herbaceous border, where many of the best and most suitable plants for this popular feature are grown side by side. Flowering now among a great number are the varieties of *Anemone japonica*, the dwarf bright rose *Physostegia virginiana* 'Vivid,' tall white *Chrysanthemum uliginosum* and shorter pink *C. rubellum*, *Rudbeckia laciniata*, *Heliopsis scabra* forms, and the blue-purple *Strobilanthes atropurpureus* of Himalayan origin, besides annuals of various sorts in the foreground. A diversion should here be made to see the Tiger Lilies and a collection of autumn-flowering *Colchicum* hybrids—of which there are also large groups in a bed at the west end of the Pinetum—in the Azalea Garden, besides the species of *Viburnum* now in berry in the same place.

Finally a walk through the Temperate and Half-hardy houses will complete the round of the Gardens. In the former the Fuchsias and Pelargoniums still continue to bloom, despite a season which began in summer, and the magnificent *Solanum Wendlandii* yet produces its immense bluish heads of flowers ; on the opposite side of the house are the pendent waxen trumpets of the twining *Lapageria rosea*, from Chile, and fruits are to be seen on the Tree Tomato (*Cyphomandra betacea*) and the Passion Fruit (*Passiflora edulis*). In the Half-hardy House *Calceolaria Pavonii* is an unusual and remarkable member of its family ; *Oxalis Bowiei* is perhaps the best species for cultivation indoors, with large bright rose flowers ; *Pelargonium Schottii* is notable for a long season and deep crimson flowers over soft grey foliage ; several species of the South African genus *Nerine*, including *N. flexuosa* and various hybrids, flower this month, whilst along one of the supports of the house climbs *Mandevilla suaveolens*, with clusters of fragrant white blooms.

FLOWER SHOWS

**Circumstances permitting, the following Shows
will be held :—**

SEPTEMBER 24TH AND 25TH

**in conjunction with the Red Cross Sale
and**

OCTOBER 8TH AND 9TH

**in conjunction with the Fruit and Vegetable
Show**

THE KITCHEN GARDEN IN SEPTEMBER.

THE month of September brings, in effect, the opening of a new cycle for the gardener, for it is a good month to begin the breaking up of grassland to cultivate more vegetables. Most gardeners will, no doubt, desire to extend their plantations of crops which have a food value, and if by the end of the month it is possible to bring the new ground into cultivation, work in the older, established parts of the garden will not be hampered later on in the season.

Seeds that should be sown during the month include such Lettuces as 'Arctic King,' 'Imperial' or 'Stansted Park,' which should be sown during the first week of the month on a warm border to remain in position during the winter. Seeds of an early variety of Cauliflower may be sown about the middle of the month and the resulting plants wintered in a cold frame.

At the end of the month Spring Cabbages sown during August may be planted out on ground in good heart, such as that from which Onions have recently been cleared. Earthing up of Celery should be continued as the plants reach the required stage of their growth, and it would be a desirable precaution to spray the plants again with Bordeaux mixture to ward off attacks of the Celery Rust.

Many crops are reaching the stage when they should be harvested and probably in most gardens by early September spring sown Onions will be ready for lifting. Carrots and Beetroot should be lifted when they attain their full growth and those not required for immediate use should be stored for the winter. Care must be taken with root crops intended for storing not to damage the roots, especially those of the Beetroot, and only sound, healthy roots should be retained. The tops should be lightly trimmed and most of the soil clinging to the roots removed. Large quantities of Carrots and Beet may be stored in clamps in the same way as Potatos, but small quantities are usually best kept in a shed. They may be placed in layers in dry sand or dry soil and the heap covered with a layer of straw or other protective material. Inspect them in a month's time.

Late fruits of Marrows may be allowed to grow to their full size and stored in a dry, airy shed for use during the winter. Late crops of Potatos should be lifted and graded before being placed in store.

In order to provide reserves of seeds in case there may be a poor seed harvest it would be a wise precaution for amateur gardeners to select a few good roots of such crops as Carrots, Turnips, Beetroot, and Onions, and store them for the winter to be planted out again next spring to provide seeds next summer. Care must be taken in the selection of the roots, to see that only those of the best type are chosen, and the selected roots should be as uniform as possible. Deformed or misshapen roots should not be selected. Peas and Beans which have been left for seed purposes will, by this time, be ready for harvesting.

They should be dried and kept in a dry place until they can be threshed out and cleaned ready for storing until they are required for use next year. It would also be a good plan to save a few seeds of Tomatos, and a number of good fruits should be allowed to ripen fully. They may then be cut across and the seeds and pulp placed into an earthenware container, allowed to stand for two or three days until they are beginning to ferment and then washed in a sieve and dried ready for storing.

Marrows may also be saved, but as these are cross-fertilized care should be taken that no seeds are saved if several varieties are growing in the vicinity. They should be hand fertilized to ensure perfect setting of the seeds.

In the event of dry weather Strawberries planted last month must be frequently watered to encourage root activity. Keep the hoe going between the rows and cut off all runners as they appear.

Support the autumn fruiting Raspberries, by running a strand of strong cord along either side of the row. If there are too many canes thin out the weakest to allow light to get to the ripening fruits as well as to permit a free circulation of air. The variety 'Lloyd George' when grown as a summer fruiting type has a habit of producing fruits on the tips of the new canes in the autumn ; this habit should be discouraged by pinching out the flower trusses as they appear.

Apples and Pears for storing must be left on the tree until fully matured, otherwise they will not keep until their proper season. To test whether Apple or Pear is ready for gathering, lift a fruit to a horizontal position, when if ready it will part easily and cleanly from the spur with the slightest leverage. Colour of the fruit, and the colour of the pips are often used as tests for maturity, but they are not so reliable as the method mentioned. The tree will not mature all its fruit at once and it is necessary to make successive pickings. The exception to the foregoing are the very late keeping Apples, such as 'Alfriston,' 'Wagener,' 'Wellington,' etc. ; the fruits of these and other such varieties which mature later in the season are left on the tree as long as possible and then taken off all at once. Only sound and unblemished fruits are retained for storing. Fruits which have been attacked by pests or injured in some other way are placed to one side so that they can be used in the kitchen straight away. Set the fruits on trays or in shallow boxes and then stand them in a dark, cool, airy room or shed. Damp the floor down once a day until the fruits have finished "sweating." The first varieties to be picked for storing will continue to "sweat" until about the end of this month and notes on storing will be found in the JOURNAL for October.

As soon as the fruits have been picked from the cultivated Blackberries cut out the old canes and tie in the new ones. It is advisable with the vigorous-growing 'Himalaya Giant' to retain one or two of the old canes, on which the laterals are shortened to two buds. On outdoor vines shorten the laterals by about half their length to encourage the ripening of the basal wood.

BOOKS IN THE RED CROSS SALE

By T. HAY, C.V.O., V.M.H.

THERE has been a remarkable response to the appeal made by the President and Council of the Society for plants, paintings and books for the Red Cross Sale, which will take place at Vincent Square on September 24, 25 and 26.

Catalogues, now available, price 2s. 6d. post free, cannot fail to be of very great interest both to the garden owner and lover of gardening and botanical literature.

The great generosity of members and friends of the Society, in the matter of books, flower prints and pictures, will be the more readily realized when the figures are examined—the catalogue contains nearly two thousand lots in this section alone, while gifts of plants, bulbs and seeds in great variety have been on the same generous scale.

It is no exaggeration to say that never before have so many gardening and botanical books been brought together and members of the Society and others interested are strongly advised to visit the Hall before the Sale if possible so that those in which they are particularly interested can be examined, catalogues marked and commissions sent to the auctioneers if the sale cannot be attended in person.

The number and range of this vast collection is so bewildering that it is difficult to give any adequate idea of what is included in the thousands of books to be sold but attention must be drawn to some of the more rare, beautiful and valuable of the books presented for sale.

Pride of place, because of its rarity, may be given to Lot 2045, this is "The British Herbal" by J. EDWARDS, an exceptionally rare herbal with one hundred magnificent plates.

There are also fine copies of other famous herbals such as GERARD, PARKINSON, HILL and CULPEPER.

For the tree lover there are books in great variety, ranging from a superbly bound set of ELWES and HENRY's "Trees of Great Britain and Ireland" in seven volumes, to the latest edition of BEAN's classic work in three volumes specially autographed by the author.

For Orchid enthusiasts there is a wide choice of books, many with fine coloured plates; these include splendid sets of Reichenbachia, the Orchid Album, Lindenia, the beautiful works of BATEMAN, LINDLEY, WARNER and many others, both old and recent.

Books by Mrs. LOUDON will attract those who like fine coloured plates, and those interested in British plants will have many sets of SOWERBY, BAXTER, CURTIS and other famous authors to select from.

Periodical garden literature is strongly represented and those whose ambitions run to a set of the Botanical Magazine will find many runs, both long and short, in the catalogue. Lot 2147 is probably

unique, being the rare second series of the Magazine in quarto size in very fine condition.

PAXTON's Magazine of Botany beloved by our American cousins is in great force, from full sets to odd volumes, and the same may be said of LODDICE's Botanical Cabinet, the Botanical Register, and many other Journals which have ceased publication.

There are also fine sets of coloured plate books by SWEET, ANDREWS, MILLER, HOOKER, MAUND, and other famous botanists. Other notable gifts are "The Cactaceae" by BRITTON and ROSE in four handsome volumes; this is now a very scarce book; a complete set of Index Londinensis, and one of COOKE's Illustrations of British Fungi in eight volumes. There is also a choice collection of books from the late Miss JEKYLL's library, including several presentation copies.

Of collections of flower prints and pictures, there are many, some of which are of great rarity. In addition to the rare and choice books mentioned above, purchasers will find the more common and useful books by the thousand tied up in lots consisting of from five to twenty volumes; among these will be found books to interest everyone no matter what their particular hobby in gardening may be—books on propagation, cultivation and manuring, on vegetables and fruit, and a great assembly on plants and flowers. Books on plant exploration by WILSON, FARRER, WARD and others, and a fine selection of the more modern books on horticulture presented by the publishers and all autographed by the authors.

PLANTS IN THE RED CROSS SALE.

By THE ASSISTANT SECRETARY.

THE plants offered include 374 lots of Orchids among which are many interesting species and a great variety of hybrids, some of which are from well-known private collections and have not previously been offered for sale. As stated elsewhere, the Orchids will be sold separately from the other plants in Sale Room "B" on the first afternoon.

Apart from the Orchids there are over 1,800 lots of other plants, including bulbs, fruit trees and plants, greenhouse plants, herbaceous and rock-garden plants, Roses and ornamental trees and shrubs. There are also over 150 lots of fruit and nearly as many lots of horticultural accessories. At each of the six sessions in Sale Room "A" an interesting mixture of all the above-mentioned things will be sold.

The greater part of the bulbs are naturally Daffodils and Tulips, but there are also Lilies, Colchicums, Fritillaries, Snowdrops, Grape Hyacinths and *Amaryllis Belladonna*. The Lilies include *L. giganteum* in various sizes, and several good hybrids such as *L. 'Maxwill'*, *L. 'Shuksan'*, *L. 'Star of Oregon'*, *L. 'Kulshan'* and the pink form of

L. princeps. Among the fruit trees are bush Apples, bush and espalier Pears, half-standard Plums, Gooseberries, and Black, Red and White Currants, together with Strawberry runners and Raspberry canes.

The greenhouse plants include Hippeastrum hybrids and Arum Lilies from the Royal Gardens at Windsor, Begonias, Carnations, Clivias, Nepenthes hybrids, Cacti and Succulents. Of herbaceous plants there is a great variety. Delphiniums, Phloxes and Michaelmas Daisies have been contributed by the leading specialists and the complete stock of a new Golden Rod is offered. There are numerous lots of Bearded Irises, choice hardy Ferns and collections of Sweet Pea seeds, and a few good aquatic plants. Gentians, Primulas and other popular rock-garden plants abound. There are also several lots which will interest collectors of rare alpines.

Of Roses there are over 400 lots. Hybrid Teas as both bushes and standards, dwarf Polyantha varieties, Ramblers, Climbers, Moss Roses and old-fashioned kinds, such as '*Rosa Mundi*', are all represented. Ornamental trees and shrubs form the largest individual item in the Sale and should find many buyers, not only because shrubs require the minimum of after-care, which is important when all gardens are understaffed, but also because of the beauty and intrinsic value of the plants offered. Among the trees are flowering Crabs, Japanese Cherries, Almonds, Peaches and Conifers. One of the Japanese Cherries, of which scions are now offered, has never been distributed before. Rhododendrons are prominent among the shrubs, and they include many choice species and plants of some of the best hybrid Rhododendrons and Azaleas raised in the gardens of the leading amateur growers of the genus. The other shrubs offered include such plants as Magnolias, Camellias, *Viburnum fragrans*, the cherry-red *Enkianthus pauciflorus*, *Eucryphia 'Nymansay'*, *Pieris floribunda elongata*, *Embothrium lanceolatum* and *Philesia buxifolia*.

Apart from 'Conference' Pears, the fruit offered consists of Apples packed in market boxes, most of which contain either 20 lb. or 40 lb. of a named dessert or cooking variety. In many places the Apple crop is light this year and the Sale will provide an opportunity to augment home-grown supplies.

The horticultural accessories are not less interesting than the plants. A complete bottling outfit, a range of vases and bowls, and a teak garden table-wagon should be particularly tempting to the ladies. For the garden itself there are lawn mowers, cloches, frames, a tipping barrow which can be emptied without tilting the frame, proprietary manures, syringes, a bucket pump, insecticides, and, for leisure moments, garden seats.

THE CABBAGE WHITE BUTTERFLY, *PIERIS BRASSICAE* LINN.

By G. FOX-WILSON, F.R.E.S., F.L.S., N.D.H., Entomologist,
Royal Horticultural Society.

CONSTANT vigilance is especially necessary this year in the Kitchen Garden and on allotments, where plantings of Brassicas have been made, to avoid serious injury to the plants by the caterpillars of the Large Cabbage or Garden White Butterfly, *Pieris brassicae* Linn. There is every indication that this pest will be particularly abundant and destructive in many parts of the British Islands during the late summer and early autumn, and growers should be prepared to take active measures against this important pest of Brassicas.

There is considerable similarity between the years 1910 and 1917 both as regards weather conditions and international affairs. The early months of both these years were characterized by severe weather which extended over many weeks, while war-time conditions have again made it necessary to extend considerably the area under cultivation by the breaking-up of waste land and pasture.

Mr. J. C. F. FRYER, O.B.E., M.A. (Chief Entomologist to the Ministry of Agriculture), writing in the Report on the Occurrence of Insect Pests in the Ministry's Miscellaneous Publications, 21, 1918, states : "The reasons for such a marked increase in the numbers of one Order of insects are somewhat obscure, but they are almost certainly correlated with the abnormal weather conditions during the early months of the year. A severe winter appears to be beneficial to most Lepidoptera (Butterflies and Moths), both directly in preventing emergence from hibernation and indirectly in curtailing the activities of enemies. . . . In considering such a subject as an outbreak of any destructive pest, a lack of balance is too often apparent, and it may therefore be well to point out that insects are subject to the attacks of many enemies, and it is seldom justifiable to point to any one as being chiefly responsible for keeping a species in check. On the whole, the weather probably exercises a greater influence on the increase or decrease of insect pests in this country than any other factor."

Owing to its migratory habits, the Large White Butterfly is occasionally very abundant in this country, and the second brood is frequently reinforced by the progeny of Butterflies that have migrated to England from the Continent.

This species is widely distributed throughout the British Isles, and occurs in Europe, Central Asia and Northern Africa.

There are two main broods, the first appearing in early summer (late April, May and early June), and the second in late summer and autumn (July to October).

Food Plants.—The caterpillars are essentially feeders on wild and cultivated plants belonging to the Families *Cruciferae*, *Resedaceae*, *Capparidaceae* and *Tropaeolaceae*, though they are known to avoid certain plants within these groups.

The presence of a glucoside—Mustard Oils (*Sinigrin*)—in the leaves of certain plants would appear to be the selective factor of the larvæ, which are strongly attracted by these oils.

The more common cultivated food plants are :—

Broccoli	Radish
Brussels Sprouts	Rape
Cabbage	Savoy
Cauliflower	Stocks
Horseradish	Swede
Kales	<i>Tropæolum</i> (<i>Garden Nasturtium</i>)
Mignonette	Turnip
Mustard	Watercress

Descriptions.—The eggs are primrose-yellow in colour, spindle-shaped and longitudinally ribbed, and are deposited in conspicuous clusters of 10 to 200, though generally in masses of 30 to 45 (fig. 85A).

The caterpillars when newly hatched are pale green with black heads (fig. 85B). The full-grown larva is bluish-green with rows of black spots down each side, the body thinly covered with short hairs, the head is paler in colour, while a dorsal line of deep yellow and a yellow spiracular line runs down the body. The underside of the body is greenish, and the legs are yellow with black markings (fig. 86).

The chrysalis is grey or greenish with a variable quantity of black spots and there is a pointed projection above the head. It is fastened with the aid of a silken girdle and an anal pad to walls, fences, tree-trunks, window-sills, etc. (fig. 85C).

The Butterfly is too well known to warrant any detailed description. It is white with a wing expanse of 2½ to 3 inches ; the fore-wings are black-tipped. The male has a black spot on the upper edge of the hind wings, while the female has two black spots and an inner marginal dash on the fore-wings (fig. 85D).

Life Cycle.—The winter is passed in the chrysalis stage, and the Butterflies emerge in late April and early May and are found throughout the summer and autumn. The yellow egg clusters are laid on both surfaces of the leaves of their food plants, though they occur more often on the lower surface. These eggs hatch in from seven to ten days and the young caterpillar's first meal is its egg-shell. They then devour the lower epidermis, later eat out small holes (fig. 85B), and eventually skeletonize the leaves completely, leaving only the mid-ribs and the veins (fig. 87).

As the plants "heart," the caterpillars descend to the centre and feed on the tender leaves.

The young caterpillars are gregarious and remain together in a colony for some time, but eventually separate out over the entire plant

and may even travel from plant to plant when food becomes exhausted on the parent plant. The eggs of the first brood are laid in May, those of the second in July and August and, if weather conditions are favourable, even later.

The caterpillar stage lasts from four to six weeks, by which time they are full grown. They then crawl away to favourable neighbouring sites for pupation. The chrysalis stage of the first brood is about three weeks, that of the second some seven or eight months.

Natural Enemies.—This Butterfly is very subject to the attacks of various insect parasites, especially during its larval and pupal stages. The most familiar enemy is the Braconid "wasp," *Apanteles glomeratus* Linn., the female of which oviposits in the body of the caterpillar. The resultant grubs live on the fat-body of their host, and as many as 80 to 150 larvae may occur within the body of one caterpillar. When these parasitic grubs are full grown, they burst through the skin of their host and construct bright yellow cocoons on the outside of the moribund caterpillar (fig. 85c). These cocoons are frequently termed "caterpillar eggs." This particular parasite is more abundant upon the second or autumn brood of caterpillars.

It is desirable to leave these yellow cocoons undisturbed to allow the emergence of the parasites, which are useful allies and aid in reducing considerably the population of this destructive Butterfly pest.

Control Measures.—The actual methods to be adopted for controlling infestations of this pest depend upon the number of plants and the area devoted to the crop.

The operations of hand-crushing the egg clusters and hand-picking the colonies of small caterpillars are not to be despised, and the careful grower can stem an attack by these measures alone. A search for the eggs and the larval colonies should be made every few days when the Butterflies are on the wing.

The Butterflies may also be captured with a net on the flowers of many garden plants, such as Buddleias and Nepeta (Catmint), and in fields of Broad Beans and Clover, the blooms of which are specially attractive for the nectar secreted by such flowers.

The most effective insecticides for destroying the caterpillars are the non-poisonous Derris dusts and the poisonous Nicotine powders. The former may be applied with impunity to maturing vegetables, the latter *only* to young plants, but both should be used against the young larvae, which are more readily destroyed than the older ones, and before any appreciable amount of damage is done to the crop.

Spraying the attacked plants with either a Derris product, Pyrethrum extract or a Nicotine and soap wash will prove effective, but greater penetration into the plants is possible with the aid of a dust than with a wet spray. It is necessary to direct the spray to the undersides of the leaves and into the hearts of the plants, for such liquids are contact washes and must wet the bodies of the insects in order to kill them.

Some relief from infestations is possible by the application of a

solution of common salt (2 to 3 ounces to 1 gallon of water). This saline solution tends to render the leaves unpalatable to the young larvæ.

A search should be made in summer and during the winter for the chrysalides, which are found attached to walls, fences, palings, tree-trunks, tool-sheds and similar situations in the neighbourhood of Brassica beds. They are conspicuous objects, and should be collected and destroyed.

Sincere acknowledgments are made to my colleague, Mr. F. C. BROWN, for the photographs illustrating this note.

BERBERIS CHRYSOSPHAERA: A NEW SPECIES
FROM TIBET.

By B. O. MULLIGAN, N.D.H.

As another new *Berberis* of the evergreen section 'Wallichianae' flowered at Wisley for the first time in 1939, it is the purpose of this note to introduce it to our Fellows, since it already gives promise of being a useful and attractive little shrub either for rock gardens or the front of the shrub border. It has been found possible to propagate it by means of cuttings, but seeds, when they become available, will probably offer a readier means of increase.

In December, 1933, a single clump was discovered by Captain KINGDON WARD on the granite cliffs of the Rong-tö valley in the province of Zayul in south-eastern Tibet. Even at that season a few solitary flowers were still present with the blue-violet fruits from which he was able to obtain sufficient seeds for distribution.

Some of these were sown in the following spring at Wisley, germinating in three weeks, and after being grown in small pots for a period were transferred to the shrub nursery, where they continued to thrive until finally nine were planted in the *Berberis* collection in Seven Acres in the spring of 1937. As the selected position is fully exposed to the south and the soil is extremely light and sandy, it would appear that the species is quite tolerant of such conditions, since the largest plants (fig. 78) are now 18 inches high and 2½ feet in width. Further, as one might expect from its native habitat, it seems to be thoroughly winter hardy, since it passed through the severe weather of January, 1940, with no more than slight browning of some of the leaves.

The measurements given, together with the illustration, will show that it is clearly a plant for the rock garden, and also give some idea of its rate of growth and development. Captain KINGDON WARD has stated in his field notes of this expedition that it is "a low-growing and spreading, almost dwarf, evergreen bush," and the Wisley plants are apparently true to type. The species is also growing at the Royal Botanic Gardens at Kew and Edinburgh, so that from this unique find

in Tibet it has apparently been safely introduced and established in Britain.

It is a small shrub, evidently spreading by underground stems; branches more or less upright, tinged red, becoming in the second year brown, the bark peeling off in strips. The thorns are triple, slender but not rigid, nearly $\frac{1}{2}$ an inch long. The leaves are evergreen (some turning scarlet in winter according to the collector), usually in clusters of 4 to 6, oblanceolate to elliptic, 1 to $1\frac{1}{2}$ in. long but only $\frac{1}{2}$ to $\frac{3}{4}$ in. wide, tough, dark green and shining on the upper side, waxy white beneath at least when young, tip blunt to acute with a minute sharp point, base wedge-shaped and tapering to the short stalk, margin recurved with from a few up to 14 spreading teeth on each side. The butter-yellow flowers (fig. 77) are nearly $\frac{1}{2}$ in. wide, produced at the end of April or early in May at least a week before those of its nearest relative, *B. candidula* C. K. Schn., singly in the clusters of leaves on one- or two-year old wood. The pedicels are an inch long, smooth, curved near the flower; the greenish-yellow slightly concave sepals spread nearly horizontally to expose the six notched petals arranged in semi-globular form. Owing to spring frosts in 1939 the fruits did not develop, but the ovules probably number from 9 to 12.

As has been stated *B. chrysosphaera*—the name, derived from the Greek meaning “golden globe,” has been published in Kew Bull. 1940, 78—is most nearly related to the more compact, mound-forming *B. candidula* C. K. Schn., a native of central China which has been in our gardens for many years. Not only, however, does Captain WARD’s new species differ markedly in habit but also in the larger, more spiny foliage widest near the apex instead of being elliptic, and possessing a hypoderm within the tissues, while the larger flowers appear earlier and are carried on longer stalks.

In all these respects it would seem to be an improvement on the older Chinese species and will in time, no doubt, become at least as well known if not more frequently planted.

HOW THE PLANT BREEDER GOES TO WORK : I.

By Sir DANIEL HALL, F.R.S.

(The substance of a Lecture delivered at the International Congress of Genetics, Edinburgh, 1939.)

THE plant breeder's work has been going on since the beginning of civilization, but though it has accomplished wonders with the food plants that sustain our life and the ornamental plants that adorn it, only within the last half-century has science begun to come to its aid. Suppose a botanical explorer, like Captain KINGDON WARD in Tibet, sends home a handful of seeds of a new plant. These are handed over to a cultivator, and when they come to maturity the plants are all very much alike ; the botanist names it as a new species and deposits a type specimen in his herbarium. Identity of the individuals is, or was, regarded as the mark of a true species. But as time goes on and successive generations are cultivated, variations begin to appear, white flowers instead of blue, a dwarf habit instead of tall, and so on. These the plant breeder notices, and if they are attractive or otherwise of value he picks them out and either breeds from them until he "fixes" the new type, or reproduces them vegetatively on a large scale. Further breeding seems to generate new variations, especially as cross-breeding between the existing variants proceeds, until we may arrive at a whole gamut of colour in the flowers, and of shape and character in the plants and leaves.

An example is furnished by the Chinese Primrose, which was brought to England in 1818 and 1826 ; as far as we know it is a true species that has never been hybridized with any other species. As introduced two shapes of flower existed, of a magenta colour. It is recorded that in 1827 the first white form appeared. Doubles were offered for sale in 1838 ; the first variation of leaf shape was recorded in 1854. In the 'sixties five new characters appeared and in the present century about twenty. The illustration (fig. 79) shows the different kinds of leaves that may be found in the plants grown every year at the John Innes Institution, Merton, England, where this plant has been under investigation for many years. The illustration only indicates how one part of the plant may vary, but all characters are subject to change ; at the John Innes Institution, where eight or nine thousand plants are grown every year, a new variation, or more properly a "mutation," in leaf or flower or habit occurs about every third year. It is unlikely to be a desirable variation, in most cases it will be something the commercial plant breeder would stamp on at sight ; but it is a mutation that can be fixed to breed true and take its place in the complex of the race. Nor is this mutation something degenerate or

pathological ; one of the Merton seedlings received and deserves the name of "feeble-minded," but it is just about the most prolific of the lot.

Now, how does all this variation come about ? DARWIN adopted a suggestion of THOMAS ANDREW KNIGHT that the introduction of a wild plant into cultivated soil, manured and supplied with abundant water, induced a sort of freakishness, as colts throw up their heels in a rich pasture—he supposed that the tendency to variation is a response to good living.

To this hypothesis, however attractive from the social and moral applications that can be made of it, modern science offers an alternative with perhaps more experimental evidence behind it. Botanists to-day are not so satisfied as were the older naturalists with the conception of the uniformity of a species in nature. On closer investigation variations are discovered in the wild material and the existence of even more latent variations may be inferred. The process called mutation is always going on in nature as in our gardens, and though means are known which will increase its frequency they are of a more drastic nature than a change from a poor to a rich soil. The processes of growth, and especially of reproduction, depend upon a very intricate mechanism ; small wonder if it sometimes misses a step or slips a cog and so starts up something new.

But what in nature is the fate of these mutations ? They occur in individuals only, and very commonly, though not invariably, they are recessive, which means that they do not show themselves in hybrids between the mutation and the type individual. Even then the odds against survival of the progeny of the mutation are great. A Poppy may have a thousand seeds, yet the Poppy population in a given field, however fluctuating from year to year, does not increase. On the average, then, 999 out of the thousand seeds must die. However, the mutation will from time to time survive and even establish a permanent place in the population in hybrid plants that carry but do not show the recessive mutation, and in this hidden condition be handed on from generation to generation. Only when two of these hybrids meet and fertilize one another will the mutation show itself in the next generation. So great are the combined odds against the mating of two hybrids, the survival of their progeny and then the observation of the emerging mutant character that we need not wonder at the apparent uniformity of the species. None the less, most wild plants constitute a mixed population containing some of these latent mutations.

Now, in cultivation the course of events is wholly different : the plant is new and rare, it is the aim of the cultivator to bring every seedling to maturity, there is neither differential selection nor wholesale slaughter. Sooner or later under such procedure one hybrid will meet and mate with another hybrid, whereupon the recessive mutant will be revealed and moreover will be observed, for the plant breeder is on the look-out for all variations, however small. On this hypothesis the first changes in a plant brought into cultivation were pre-

existent but hidden in the wild population, and became apparent through the relief from selection practised by the grower. Other mutations follow in their turn, and when good are preserved and fixed, even though in nature they would have an inferior survival value leading to their elimination from the population. In turn also follow the combinations the plant breeder can effect between the characters developed by the mutations.

This is the simplest case of all—variations within a single species, and in such cases all that science has been able to do for the breeder is to teach him the normal Mendelian generalizations whereby he learns how to fix a character if it is fixable, and what are the odds against obtaining any desirable combination. Of course, this simplicity only holds for what may be called clean-cut characters, like colour or leaf shape, which are inherited as wholes and segregate in the progeny unchanged or not at all. There are other quantitative characters like size, flavour, percentage of nitrogen or sugar, which are found in both parents in different degrees and cannot be defined as present or absent. Such characters the breeder can influence only by slow stages, generation after generation. This is the sort of gradual change envisaged by DARWIN, whereas mutations are "jump" changes which occur in a single step and are inherited in full. Hitherto genetic science has mainly been concerned with these cleanly segregating characters but is nowadays turning to the study of the quantitative side of the question, which indeed is often of more economic importance.

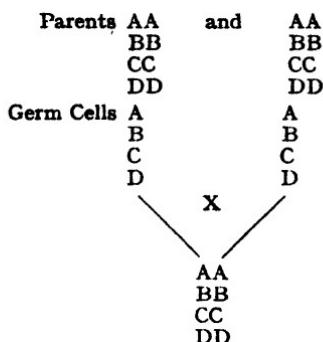
With the Chinese Primula and the Sweet Pea we are dealing only with change within a single species, but very often our garden plants are the product of hybridization in which two or more species have participated. The obvious result is that the plant breeder has more genes to work with. A gene is the unit fraction of a chromosome which controls the development of a particular character such as sex or colour. The genes are strung out along the chromosomes, which are the portions of the organism that are handed on from one generation to another and are the physical carriers of heredity. Mutations are equally to be expected, but hybridization itself may produce new characters which did not reside in either parent. A remarkable illustration is afforded by the garden Streptocarpus, the history of which is so recent that the steps can be traced. The genus is African, and the garden varieties began with the hybridization in 1886 by WATSON, at Kew, of a species, *S. Rexii*, with blue markings, with a newly introduced species, *S. Dunnii*, with red flowers. The two species are remarkably distinct; *S. Dunnii*, for example, possesses only a single enormous leaf, and the great series of garden varieties while, generally speaking, intermediate, have reached their present position by continued selection for larger flowers, more distinct colours and better habit (see Figs. 4 and 5, JOURNAL, January 1940).

These colours have, however, been recently analysed by Miss SCOTT-MONCRIEFF, LAWRENCE and PRICE, and exhibit a mechanism of change hitherto unsuspected. The pigments concerned are anthocyanins,

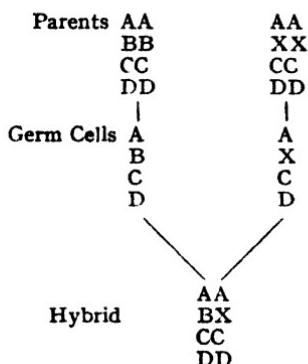
and the starting points are a cyanidin in *S. Dunnii* and a malvidin in *S. Rexii*. These pigments possess a certain basic structure in common, but differ in the place and nature of the chemical groups attached to it. On hybridization these secondary features of the complex molecule change places on Mendelian lines to give rise to new pigments. In place of the two pigments in the present species the hybrids exhibit six colours, as well as the white which results when the gene for anthocyanin drops out.

Of course, this is not the whole story ; there are other genes which modify the intensity and the distribution of the colours as, for example, the race which Mr. PUDDLE, of Bodnant, is producing in which the colour is confined to the lower petals. But as the location of the various genes becomes known the control of the plant breeder over the type of flower he sets out to produce will become greater.

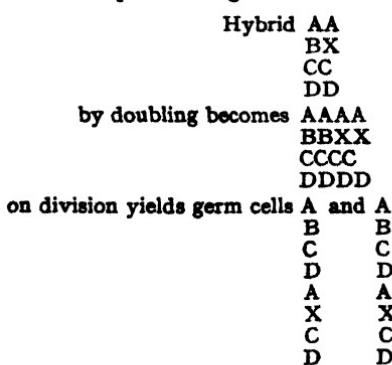
The effectiveness of hybridization as a tool for the plant breeder is, however, limited by the fact that hybrids between species are very often sterile, indeed this inter-sterility has often been appealed to as the criterion of specific distinction. The first recorded plant hybrid, produced by THOMAS FAIRCHILD, in 1719, by crossing the Carnation and Sweet William, is sterile and can only be reproduced by cuttings. This is of no moment when the hybrid is in itself valuable and can be multiplied vegetatively, but it is a bar to further progress. Of recent years a means of getting round this awkward corner has been discovered. The story begins with a sterile hybrid between *Primula floribunda* and *P. verticillata* made at Kew a few years ago and called *P. kewensis*. This was a good deal grown, and on one occasion a plant in Veitch's nursery at Exeter was observed to possess a branch bearing seeds, which proved to be viable and the starting point of a fertile race. These fertile plants were almost identical with the sterile original but a little larger and more vigorous. The plant was subjected to cytological examination, as cytology was at that time just beginning to interest the geneticists, and proved to be a tetraploid with 36 chromosomes instead of the 18 of each of the parents. An explanation of the restored fertility was thus obtained. This restoration of fertility is so important that it is worth while attempting an explanation in detail. A normal plant is a diploid and contains two sets of chromosomes, each member of the set having a partner—identical, or nearly so, in the other set. Prior to the act of reproduction the plant prepares a series of germ cells, each of which contains only one of the sets of chromosomes of the ordinary cell of the plant, this "reduction division" being preceded by an orderly pairing of the partners. These germ cells constitute the ovules and pollen cells respectively, and when the pollen cell and ovule unite in ordinary self-fertilization a new cell is built up with two sets of the chromosomes as before, and this is the starting point of the plant which will be identical with its parents. Diagrammatically we can represent the process (assuming for simplicity a species with a set of only four chromosomes).



But if two species of hybridization are concerned then one species differs from the other in at least one chromosome and our diagram will be :



This hybrid constitution may be well enough balanced to allow the plant to live (not always, for some plants will not hybridize), but when it comes to the pairing process prior to reduction B and X may refuse to join and so throw the whole mechanism out of gear. The hybrid is sterile in consequence ; either ovules or pollen grains, sometimes both, have failed to form properly. But suppose a hybrid cell doubles itself through the breakdown of a cell wall between two neighbouring cells in their earliest stages so that a new cell is formed and becomes the starting point of a plant with twice the original number of chromosomes, then it is easy to see that pairing and equal division become possible again.



which on sexual union restore the doubled hybrid and is called a tetraploid.

A parallel case is the Foxglove obtained by crossing *Digitalis purpurea* with *D. ambigua*. The hybrid is sterile, but on more than one occasion it has spontaneously produced seeds, which prove to be fertile tetraploids with twice the parental number of chromosomes, similar to but rather larger than the hybrid. Similarly, when LAWRENCE crossed *Streptocarpus grandis* with a garden variety, the resulting hybrid was sterile, though many attempts were made to cross it. On two occasions, however, a seed pod has spontaneously developed to give rise to plants with 64 chromosomes instead of the 32 of the parent. These are fully fertile, a race of charming garden plants known as 'Merton Giant.'

Similar tetraploids due to the accidental doubling of a cell occur from time to time, like the well-known giant form of *Campanula persicifolia*, called 'Telham Beauty.' They are not unknown in nature. For example, the yellow nodding Tulip, *T. silvestris*, common in the vineyards of Southern Europe, has evidently resulted from the doubling of a very similar but smaller species, *T. australis*, which, however, is only found on hilly, uncultivated land.

Since the tetraploids generally are larger and finer plants than their hybrid diploid parent and possess the greater variety of genes associated with hybridism, polyploidy, which means the repetition in greater numbers, 3 to 8, of the chromosomes of which there are two sets in the diploid, becomes a character of value to the plant breeder, and a variety of attempts have been made to induce its occurrence instead of waiting upon the rare accident of its spontaneous occurrence. It has been found that if you take a young Tomato plant growing vigorously at about 6 inches high and cut it across at a node, a callus forms from which springs a crown of adventitious shoots. Among these one or more may be distinguished by a more vigorous habit; they can be detached and rooted to form a plant which proves to be tetraploid and fertile, though less so than the parent. With the best technique as many as 17 per cent. of these shoots can be obtained, but this procedure, though it has been successful in a few other cases, is not generally applicable (fig. 80). More recently it has been found that the applications of a material called colchicine will increase the occurrence of polyploidy, and this method is now being extensively explored. Other treatments which may be calculated to disarrange the mechanism of the cell, such as heating to something short of the lethal point, also give rise to polyploid cells, but this method more generally applies to the sexual reproduction of polyploids rather than to somatic doubling.

(To be concluded).

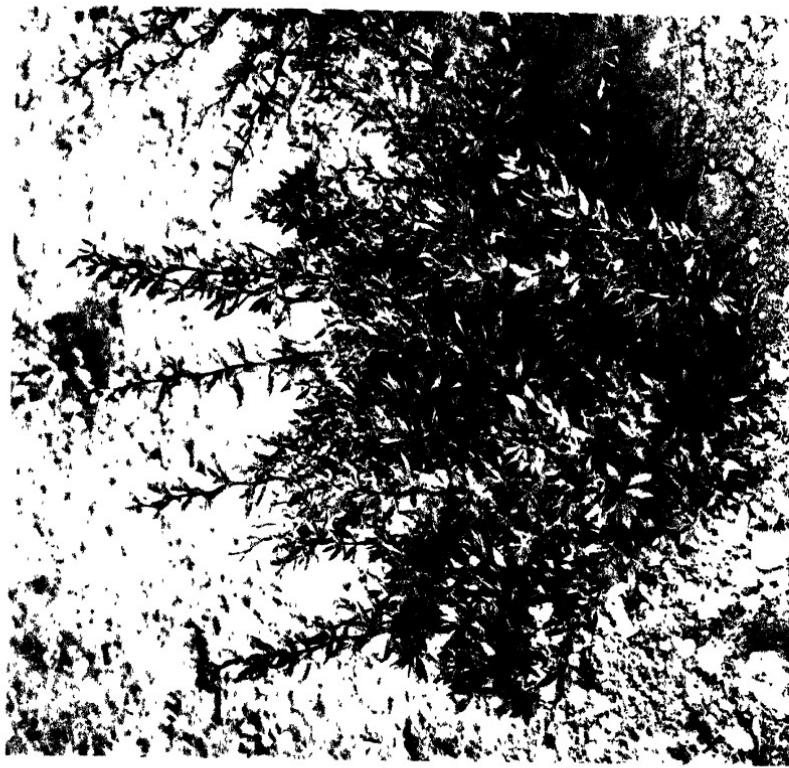


FIG. 78.—*BERBERIS CHRYSOPHAERA* AT WISLEY



FIG. 77.—*BERBERIS CHRYSOPHAERA*.

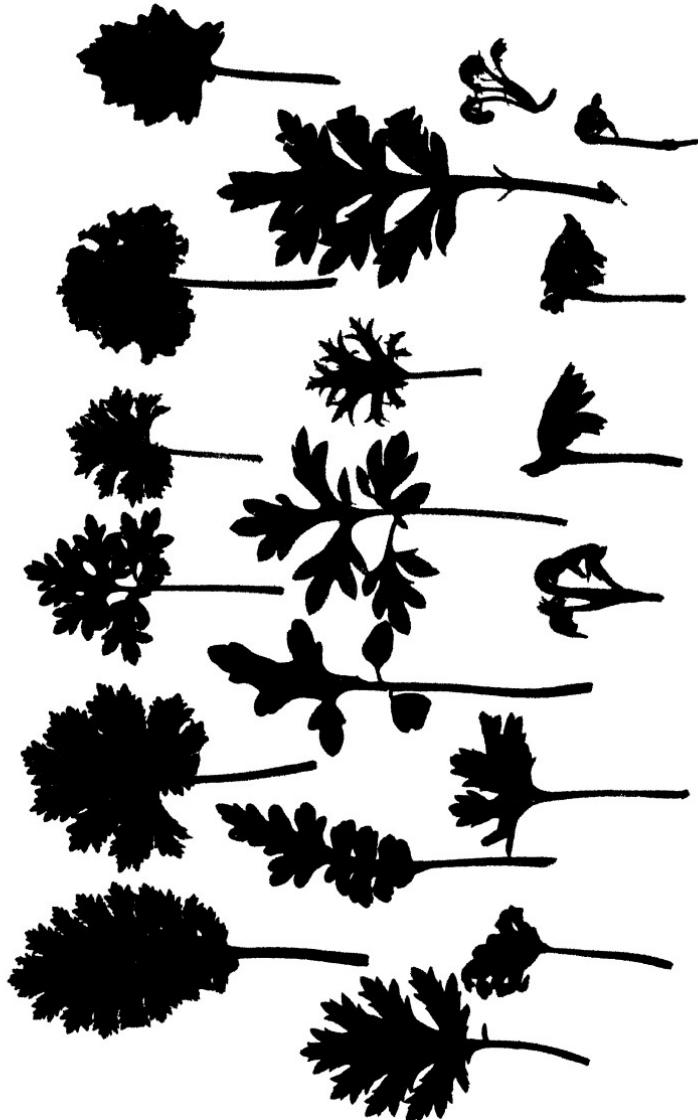


FIG. 79.—*PRIMULA SINENSIS*: TYPES OF LEAF WHICH HAVE BEEN FIXED IN DIFFERENT RACES.
(See p. 283.)

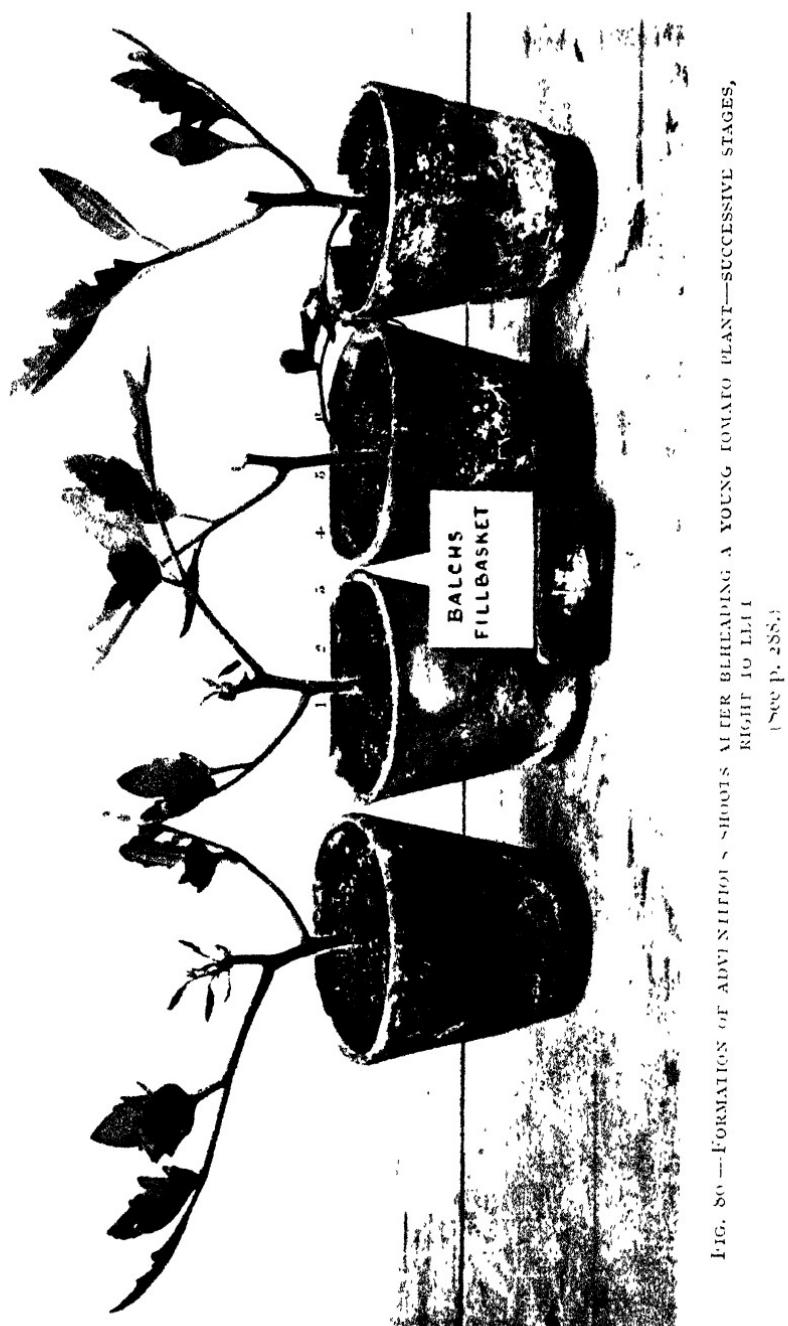


FIG. 80.—FORMATION OF ADVENITIOUS SHOOTS AFTER BLIMMING A YOUNG TOMATO PLANT—SUCCESSIVE STAGES,
RIGHT TO LEFT
(See p. 288.)

FIG. S2.—*ESPELETA GRANDIFLORA*

(See p. 289.)

FIG. S1.—*SENECIO FORMOSUS*

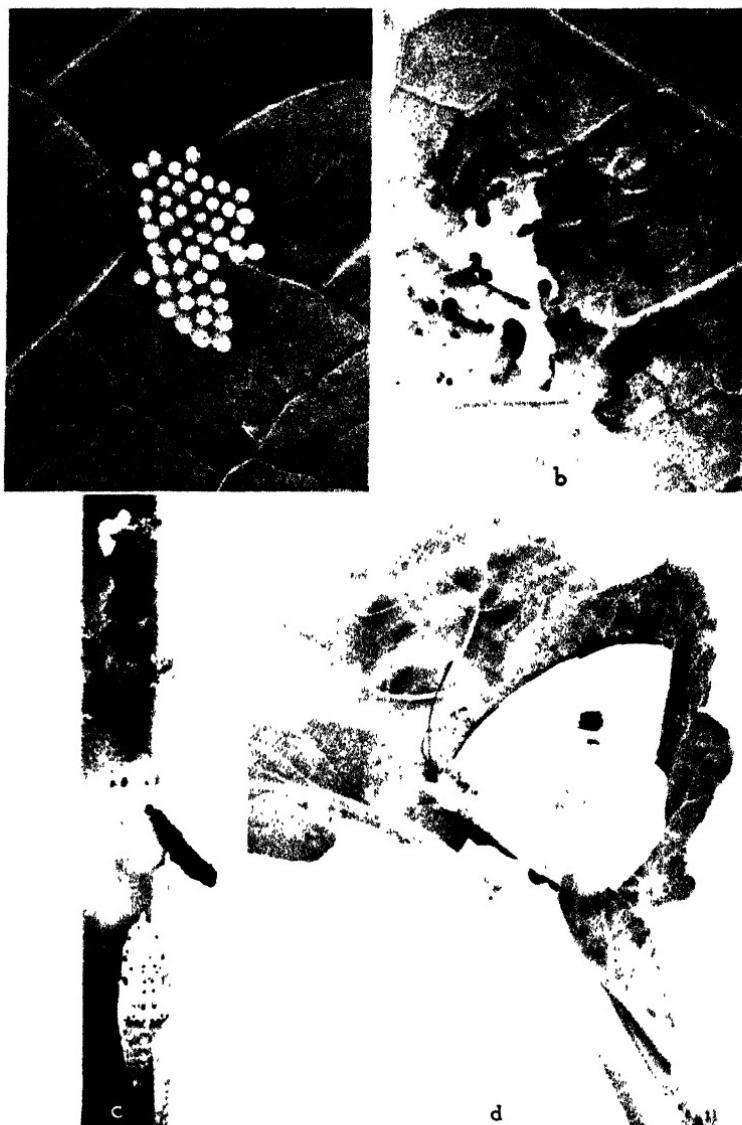




FIG. 84.—*LUPINUS ALOPECUROIDES*

FIG. 83.—THE CACTUS VALLEY OF TUCUMÁN, NORTHERN ARGENTINA.
See p. 280.





Photos F. C. Brown

FIG. 85—THE CABBAGE WHITE BUTTERFLY. (a) EGG CLUSTER; (b) COLONY OF YOUNG CATERPILLARS; (c) COCOONS OF APANTELES PARASITE SURROUNDING DEAD CATERPILLAR; AND (d) ADULT BUTTERFLY

(See p. 278.)



Pseudaletia separata
FIG. 86.—CABBAGE WHITE BUTTERFLY CATERPILLARS
ON CABBAGE LEAF.

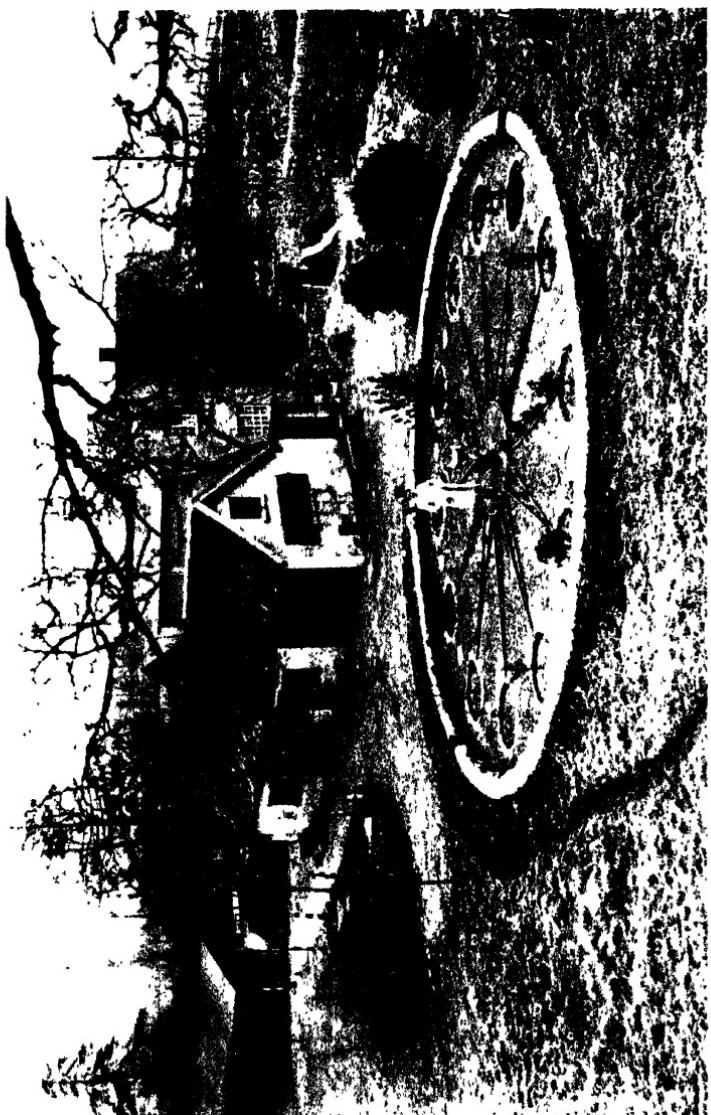
(See p. 278.)



FIG. 87.—CABBAGE WHITE BUTTERFLY
SPROUT PLANT SKINNED BY CATERPILLARS.

To face p. 289.

FIG. 88.—A NOVEL FLORAL CLOCK.
(See p. 306.)



EXPEDITION TO THE ANDES, 1938-1939.

By E. K. BALLS.

WHILE still collecting in Mexico I received a cable from the Imperial Agricultural Bureau in London asking me to take charge of a small expedition into the Andes to collect Potato material for scientific study at the Experimental Station at Cambridge; so, leaving Mexico with Dr. W. BALFOUR GOURLAY in the end of November 1938 I travelled down to Buenaventura, in Colombia.

The Paramo, north of Bogota, was very full of flowers at that time and was extremely interesting. December is an excellent month in which to go flower-hunting in this part of Colombia. There was a number of magnificent Ericaceous shrubs in full bloom, and very handsome Macleania, Cavendishia and Pernettya in fairly wide variety. Perhaps one of the most handsome of the herbaceous plants of this region was *Senecio formosus*, a brilliant red-purple flower, 1½ in. across, with a deep brown disc, in full, dense heads on stout, hairy stems up to 2 feet tall (fig. 81). Happily, the plant was in seed as well as flower at this time. This is a somewhat unusual occurrence. Bomarea flamed orange in all the hedgerows, some of them climbing twenty feet before opening out their great globular heads. These were mainly *B. frondea*, though there are a number of other species which may occur in these same regions. Perhaps the most interesting of all the plants of this part of the Andes are the Espeletias, which are entirely endemic to the northern Andean region, down as far as the northern *paramos* of Ecuador. They are essentially plants of the high hills, and, although a very small genus, have quite a range of differing habit. All are rosette-plants, but the smaller species make a stiff little rosette, perhaps 18 in. across, which never rises off the ground, while the larger and more imposing species hoist their crowns of stiff, grey-flannel leaves on to a stem which is often as much as 20 feet tall. Fig 82 illustrates *E. grandiflora*.

From Bogota Dr. GOURLAY and I travelled down to Quito by car. The Paramo del Angel, in north Ecuador, was extremely interesting, with its queer forests of Espeletias and, a little lower, great handsome plants of *Puya gigantea*, which I saw later in flower on my return journey. As we descended from the highlands the valleys flamed with Fuchsias and scarlet Passion flowers in the hedgerows. On Christmas Day we wandered into the gullies of the Pichincha hills, above the city of Quito, collecting bright Orchids, Passion flowers, Echeverias, and a great variety of other blooms. We succeeded in visiting the small hill of El Ilalo, a few days later, to find just the same numbers of gay flowers blooming. Among them were some attractive Bomareas, which the peasants there insisted on calling "wild Potatos." The

Bomarea there is a pest in the fields and is destroyed wherever possible, although it still crowds the hedgerows and with a brilliant pink Tacsonia makes them exceedingly colourful at this time of year.

Having made our bow to the officials at Quito we took a train to Guayaquil on our way to Lima. On the hills all round the city and in many of the swamps and meadows late December is almost worth its discomforts for the beauties of *Leptochiton quitoensis*, a glorious white-flowered Amaryllis, whose blooms certainly look as though they could never be produced outside a hothouse—of course, they could not in England.

From Callao we sailed to Mollendo and travelled by train to Jujuy, in the northern Argentine, after brief stops at Arequipa and La Paz. Jujuy is fairly low-lying and I think that it is extremely doubtful if much of the flora from that region is likely to be hardy. It is a lush and attractive place. On our wanderings in the district we gathered a number of wild Potatos among the general floral collection. But the country which would really be worth a further and far more extended visit is the mountain region above the village of Tilcara in the province of Jujuy, between that town and the frontier. From this little village we set forth with mules and men to travel into the wilds. It was a somewhat unpropitious journey, for we were attacked by rain and snow and a good deal of buffeting cold wind. But all those inclemencies cannot blot out the enthusiasm we felt for that region. From the village we struggled up through a dry, hot valley with gigantic Cacti standing 40 feet tall (fig. 83) and casting the thinnest strip of shade in which to rest for the noon-day meal. The ground was strewn with Opuntias and all the prickliest of the Cactaceae, with such xerophytes as a queer, leafless Cassia. Numerous bulbous plants showed leaves although the flowers were rare and disappointing. There was one brilliant little plant, as we climbed higher, which I would rejoice to see in rock gardens at home, *Hypseocaris pedicularifolia*, 'Madre de la Lluvia' (Mother of the Rain). The flowers are a brilliant scarlet-orange with a yellow base, opening in flattish cups, held only slightly above the ground on short stems in a rosette of delightful, finely cut leaves. Later, on the Bolivian *altiplano*, we collected seed of this species, but there it is not constant to this colour and the yellow, pink and white varieties have not quite the excellence of this brilliant form, which does also occur on the *altiplano*. I have hopes that among the seed which we finally sent home the scarlet-coloured flower will occur.

At about 11,000 feet we camped for the night upon a carpet of *Solanum acaule*, a delightful little species of Potato with completely prostrate, hairy rosettes and purple flowers borne on very short stems, singly, in the centre of the rosette. There appears to be an endless variety among these plants. It made a most charming paving plant when later we found this same little Potato growing freely between the cobble-stones of the city streets in Potosi, in south Bolivia. Crossing the range from this camp we climbed to well over 12,000 feet and

encountered the curious, hard, cushion plants of these ranges. A pale-flowered *Verbena* looked as though it might be a green, petrified moss; *Azorella*, solid and domed, oozing blobs of white gum, which the Indians use as a fuel. There was a tiny *Calceolaria* with stems an inch tall and pouting, yellow flowers far too large for the size of the plant and stemless, bright blue *Perezias* in a mossy cushion of hard green rosettes. Almost all the plants showed the effect of the high top, as they are open to the bitter and merciless blasts of all the winds. The second night we camped by the Red Lake ("Laguna Colorado"). From the long, high valley in which the Red Lake lies we descended into a sharp, narrowing valley, cutting down into the eastern slopes of the range. As soon as we left the tops the vegetation began to expand. There were two delightful cream-coloured *Caiophoras* and a gorgeous, scarlet-flowered *Loasa*, one of the most handsome plants we saw there, even though strongly armed with bright, stinging hairs, typical of the majority of the Loasaceae. The valley, as we descended, was brilliant with colour, *Lupins*, *Calceolarias*, violet-blue *Salvias*, *Gentians* and great numbers of bright blooms. We found a number of interesting wild *Potatos*, one of them growing in the running water of the small stream which rushed down the valley. The place tempted us to linger many days, but food was running short and our men were unwilling to face the prospect.

In south Bolivia we visited Tarija, on the way to the Chaco, that "Green Hell" so hotly disputed by the Bolivians and the Paraguayans a few years ago. Across the high plains which lie around Villazon, tall *Cacti*, with a white, hairy covering, raise gaunt heads on scraggy necks like fantastic, misshapen llamas! Later, as we entered the hills, there were flocks of glorious rose-coloured flamingoes wading along the margins of the lakes and great, black-and-white geese which hardly bothered to leave the roadside as we passed. These high valleys are excellent grazing land and there were numbers of fine cattle scattered over the landscape, but few flowers. Here and there patches of *Potatos* seemed to be the only cultivated things. The villages were small, scattered and primitive and very far apart. The town of Tarija lies too low in the valley for its flora to be at all hardy in England. The place is surrounded by *Cacti* and spiny bushes. Brilliant patches of *Verbena Chamaedrys* brightened the brown turf and in the hills there were some delightful Zygophyllaceous creepers which would have been even more attractive if they had given the least promise of being hardy. We came across an interesting stand of *Solanum simplicifolium* considerably further to the north than it had previously been recorded. That strangely wet place, at about 11,000 feet, was full of fine plants. A charming *Begonia* grew in tufts from the wet, rocky walls, with *Calceolarias* of at least four species in the usual profusion, and a *Loasa* appeared in both yellow and bright orange, as handsome as any of these stinging plants.

Potosi was better for *Potatos* than for anything else, although below the town, at over 12,000 feet, the stone walls were mounded

over by a delightful pale yellow Calceolaria. It was in the valley below Potosi that we first came across the bright, green bushes and brilliant orange flowers of *Mutisia viciaefolia*, a real shrub among the genus which is usually represented by climbers.

A short, easy railway journey takes one from Potosi to the ancient Bolivian capital. Sucre is considerably below Potosi, and the climate is far more pleasant. On the whole it was rather dry at the time of our visit and the Potatos were already passing out of flower. There were numbers of interesting wild species in this region, and on the whole it was far more fruitful of Potatos than the higher region of Potosi. On the hot rocks not far from the city, small pale, grey-blue flowers of *Passiflora foetida* were very attractive among the sticky, yellow-green leaves. A bright red, sub-shrubby *Salvia* was striking also, as were the brilliant flowers of *Tropaeolum tuberosum* in the fields, where the plant is cultivated in rows with the Potatos and *Oxalis* for food. Sucre has the secluded refinement of a cathedral city, and may suitably be said to be the "cultural centre" of Bolivia. It has far more the dignity of a capital than the garish, new and very raw La Paz, and is a place of warm climate and leisurely occupation.

At Cochabamba we were taken in charge by Dr. MARTIN CARDENAS of the University there. Here we also fell in with Mr. WALTER J. EVERDAM, of Dr. GOODSPEED's expedition, with whom we compared notes on plants and places. Around Cochabamba we found plenty of occupation. The slopes near the city were full of interest. A glorious, shrubby Cleome with pink flowers and long red tassels of stamens, but an unpleasant smell, was beautiful in the stony river bed close to masses of pale blue *Salvia*. Bright pink Gerardias, a fluffy white Clematis and aromatic Labiates banked among the dry stones of the river bed. Climbing over many of the shrubs was a charming little white-and-blue-flowered Passiflora. We travelled eastwards to the village of Colomi, and up into the mountains, crossing to the cold, wet slopes on the upper edges of the jungles which stretch away across Brazil to the Atlantic coast. Those mountains were crowded with good plants. We gathered five species of Gentian in one day—blue, white, purple, and almost magenta. There was a galaxy of Gaultheria, Vaccinium and Pernettya and one of the most delightful little dwarf Rubus which I have ever seen, with soft leaves making a dense matted carpet, bright pink flowers and the fruits a clear transparent green, looking like nothing so much as "mint gums," although without that flavour. A number of attractive Wernerias were growing in the close-cropped turf, of at least two or three different species, and among the shrubs slightly lower down a brilliant orange-flowered Caiophora rambled luxuriantly, looking particularly handsome with its immense profusion of flowers. The finest pale pink Gerardia one could wish to see grew on the moist slopes lower down the easterly valley, and in the turf was a quite attractive and very dwarf Cosmos. When we came to the jungle-like woods, dripping with lichens, Tillandsias and rain, the plants became too numerous to deal with in one short visit.

Bomareas with gigantic scarlet and orange flowers climbed 40 feet into the trees before opening their blooms. Bright yellow Calceolarias showered down upon one in cascades from 20 feet above and even the wild Potatos pushed up through the dense tangle of bushes until their great, soft mauve flowers opened on the ends of haulms at least 8 feet tall!

On the hills around Puno we saw *Crocopsis fulgens*, which should be good if it lives up to its name, and also a delightful scarlet Zephyranthes; the magnificent *Stenomesson aurantiacum* grows on the Island of Estebeis just out from the shore at Puno. It was not until we reached Cuzco that I saw specimens of the flowers of this latter plant in the herbarium of Dr. CESAR VARGAS of the Cuzco University. Then I realised what a fine plant it is and its possible value in cultivation. It should be hardy enough for Lake Titicaca is at 12,500 feet, and is cold enough, even in summer, for the hardiest.

We left Cuzco, taking the trail across the mountains by way of Abancay, Andahualas and Ayacucho and found many interesting plants. A delightful scarlet-flowered, annual Gentian, with a slender stem about 15 inches tall, bore great numbers of dainty, pendent flowers, a real scarlet both inside and out.

On the higher *paramos* in South Ecuador and in some of the woods there were a number of particularly delightful plants. One of the most striking, I think, is *Calceolaria ericoides*, with its stiff, upright habit and fine, dark green leaves, like those of an Erica, tipped by a long, slender and narrow-pointed spike of bright yellow "slippers." It grows in large tufts over the grasslands and along the banks and roadsides, and is, so far as I saw, quite local. Another rather startling plant of the same region was a shrubby Violet of the woodlands, with loose, woody stems, often 3 feet long and sprawling over the high banks in deep shade, carrying a great number of leaves and as many rather small, brilliant scarlet Violets.

Between Cuenca and Quito we stayed a while in Riobamba, but Chimborazo, Ecuador's largest and most imposing mountain, was bare and uninviting and we found little of real interest on his great flanks. Later we stayed a while at Ambato and there collected some attractive flowering bulbs which will probably be only on the borderline of hardiness, but should be good for indoor cultivation. Since Ambato is a place where giant Poinsettias flourish in the open, it can scarcely be expected to supply anything really hardy. Before returning to Quito from Ambato I decided to climb Mt. Antisana, at least to the snowline, for beyond that I have no interest. It seems I was ill-advised as to the point from which to start and made a four days' journey of what might have been accomplished in two.

The first night we camped at about 14,000 feet, in a small grove of Senecio-like trees, somewhat sheltered but bitterly cold, on the slopes of Yana Sincholagua. I had brought neither tent nor blankets with me, travelling as light as possible. My guide and I rolled up together in his poncho on a bed of grass and branches, warm enough, although

not with much prospect of sleep. Above us the screes ran steeply up to the snows and the gaunt dark cliffs were scattered with a curious, strong-smelling shrubby Valerian and an attractive, white-flowered composite shrub. At the uppermost ends of the screes stood a few scattered white spires of *Lupinus alopecuroides*, one of the most handsome species of the genus (fig. 84). Its flower spikes are so densely covered with long silken hairs that they look almost like pure silver, and the tiny white or pale blue flowers are completely buried in the fur. The leaves are as handsome as the flower spike and almost as hairy. The plant is an extreme alpine and I never saw it below 14,000 feet. Another rather striking plant of these hills is a dull-scarlet Lycopodium, standing in stiff, upright and bushy tufts. In places these hills were stained almost blood-red with this curious plant.

The next day we set off at dawn for M. Antisana. We crossed over acres of boggy ground in which great mounds of Azorella made the country curious and extremely troublesome to travel in. Here and there were swathes of a delightful purple-blue bush Lupin, in the coarse tufted grass. Among the Azorella and in finer turf was a lovely scarlet-flowered Gentian. I believe that this is *G. cernua*. It is of a soft, clear scarlet inside and out and almost globular and the flowers never seem to open fully. Its habit is frail, threading through the turf rather in the way of *G. pyrenaica*, although the flower has no resemblance to that species. I saw a single plant of this Gentian with perfect primrose yellow flowers, but there were no seed capsules and there was no hope of transplanting such a plant and getting it back to England alive. Just below the snowline at about 16,000 feet we found the sheds of a *hacienda*, where a couple of Indians, a man and a woman, were stationed to look after the cattle. They took us in and gave us shelter and even beds of a sort. The two nights which I spent there were far worse than sleeping out on the open mountain-side when I could roll up with my companion instead of lying lonely and unprotected on an unsatisfactory bed! From the *hacienda* to the snowline was a short ride. I found that at this altitude I was glad enough to ride as much as possible. Walking became a slow process and there was no chance of hurrying when breath became short and one's limbs leaden with the least effort. The scarlet Gentian was abundant in the swampy ground between the *hacienda* and the scree slopes. But it was in full flower instead of being more advanced with some reasonable chance of ripened seed. I was seeking especially one of the rosulate Violas, which I had tracked down to this mountain. Up in the screes by the snows where I had expected to find the plant there was no sign of it. A few dense cushioned Composites, quite attractive in their way, a very delightful, dwarf and pale mauve Malvastrum, of which I should have greatly appreciated seed, and a curious, dowdy, cushioned little Valerian were about all that the screes held. Then the clouds came down and it began to sleet. It was bitterly cold and the discomfort, with my disappointment over not finding the *Viola*, did not add to my good temper. I tried to find

out if the men knew anything of the *Viola*, but could only get from them news of a plant which they called "Urco Rosa." They were certain that this was the plant I was seeking. I was equally certain it was not, from their description. However, for want of some better direction to take I decided that it might be worth while to look up the plant. An hour's ride through driving sleet and fog, over rough scree and irritating bog brought us to a standstill. We left the animals standing disconsolate, their tails to the wind, too miserable even to move away. Accompanied by a dozen dogs of the most mixed breeds we set out over the bog for the "Urco Rosa." We finally climbed down a steep cliff by a drenching waterfall, through thickets of an uncompromising Composite shrub, to find the plant growing in the dense shade of dripping cliffs. It was certainly well worth the adventure but was, as I expected, not the plant which I had been seeking. "Urco Rosa" is a brilliant scarlet *Ranunculus* with a bulging yellow centre. The petals are in-curled in the form of a turban, and the whole is extremely effective. Leaves and stems are very hairy and the plant is of a rather coarse growth, but well worth an effort to bring into cultivation. A few heads bore seeds which, while looking quite green, fell from their cones at the least touch, so I hope they may have been in fit condition to germinate after they reached home. Also I saw some particularly attractive blue Lupins, almost as hairy as *L. alopecuroides*, which I decided to collect. When everything was down and I had the press out, and as we were warming up again, sheltered from the wind in a slight hollow, this seemed a suitable time for lunch. It was not until everything was again packed on to the mules that I suddenly saw the very plant I had come so far to seek in the turf at my shoulder. The *Viola*, instead of growing in the scree as I had expected, was a plant of the fine turf. The rosette was no more than 1½ in. across and the Violets of the tiniest, pale cream with faint purple veinings. I was rather disappointed in the plant itself, but satisfied in the end that I had found the species previously recorded from M. Antisana. The ride home on the following day was pure torture, but I was determined to get through with it and we did about fifty miles at an almost constant trot from the Hacienda Antisana to Machachi.

EXPERIENCES WITH SOME WALL SHRUBS AND CLIMBERS.

By C. S. ORWIN.

I HAVE no title whatever to address my fellow members on any gardening subject, but for a good many years I have been particularly interested in attempts to grow some of the less common wall shrubs and the Editor has suggested that I should record my experiences. Let me say at once that I am not an expert in shrubs and that the choice things which I have never tried far out-number those which I have grown. At least I can claim that the following notes record only what I have done and seen myself, that except for six months I have never had the help of anyone more expert than a garden labourer, that I never had a greenhouse in which to raise or winter plants and that I never bought a square yard of matting with which to protect them, in my life. Anything that will not survive with me without cosseting and coaxing, must die; there are too many lovely things which prove themselves hardy and accommodating to make it worth while bothering about the others.

When I began to garden, to visit Wisley, the Shows and all the nurseries that I could, the thing that struck me most about the gardens that I knew was the neglect of shrubs. Not many, probably, among the Society's 40,000 members, are lucky enough to have space in which to indulge a taste for shrubs at large; most of them, on the other hand, have houses and can experiment with shrubs for walls. I do not intend, in these notes about plants that I have grown, to give a catalogue of the lovely things which everybody knows. I want to refer only to shrubs which I have less commonly encountered.

The only principles which have guided me have been always to give a choice thing a chance and always to be on the lookout for shrubs that are at their best either almost before winter is past, or in high summer and later. The name of the spring-flowering shrubs is legion. Further, I have tried to remember that while east walls and north walls are problems, there are shrubs, and good ones, which will endure them and not a few which prefer them. How often, for example do you find Camellias planted in situations such as these? And yet in the garden of Holywell Manor, at Oxford, Balliol College has one which immediately the frost breaks covers itself with pure white flowers. True, the later frosts which follow the winter cold usually sear the blossoms that have opened, but the flowering season is long and others will replace them. There are coloured varieties, of course, as well as white ones; some are bushes clothing only a few feet of wall and some are real climbers. In a general way, I find it best to pick the white flowering varieties of any shrub for red walls and the coloured

varieties for grey walls, but the deep green foliage of *Camellia* is a background in itself and there is no need to be particular. At Holywell Manor all the walls are of stone ; the house is only a few feet above the flood level of the Cherwell : the soil is the river gravel. May I take you round and point out some of the things that you will not find in every Oxford garden ? Many of them are gifts from good gardeners among the old members of the College.

The Camellias are in the Fellows' Garden, enclosed between the 15th century manor-house and the Church, in which is the Holy Well that gives the name to this district of Oxford. They grow in full shade, on the north wall. Opposite to them, and enjoying all the sunshine that there is, *Campsis (Bignonia) radicans* ramps. Except that it flowers in the middle of the Long Vacation I cannot understand why it is not grown on every stone wall in Oxford. It clings like Ivy (though a few horizontal wires will keep it from breaking away) ; it is perfectly hardy, and its bunches of red trumpets nearly three inches long, well set in the bright green foliage, are very effective.

Campsis is a leggy climber ; all its foliage and its flowers grow high up, and there is room in the border below for something less vigorous. Here you will find *Veronica Hulkeana*, delicate, and cut sometimes but never yet killed by frost, and quite lovely in early summer with its panicles of lavender-blue flower-sprays against the grey walls and its own glossy, dark-green foliage. On the same wall is *Solanum jasminoides*, a weed in the west of England, but said to be barely hardy in the Thames valley. This one has had six years uninterrupted growth ; it is held to the wall by a few horizontal wires, from which the new season's growth hangs in graceful masses, the green thickly interpersed with beautiful white flower trusses, from June until the first frost. On the same south wall there is also *Solanum crispum*, illustrated in the February issue of the JOURNAL. This species grows even more vigorously, and the pale mauve flowers, so suggestive of its kinship with the Potato, are borne in the greatest profusion through a long part of the summer. In an angle facing South and West, the College has experimented with two plants not common in this part of England, *Acacia dealbata* and *Myrtus communis*. The Mimosa has survived four winters, but it has not flowered, and from its looks I fear this January has proved too much for it. We may try again, for at Radley, only a few miles away, there is a thriving specimen. The Myrtle, on the other hand, is a stout bush, flowering in July and August as profusely as any in the West.

The Fellows' Garden is a sunk garden, and it ends in a plain retaining wall, eight feet high, with paving up to the foot of it. The soil comes to the top on the far side, and here is planted *Muehlenbeckia complexa*, which hangs down the wall face in masses and long tendrils halfway to the pavement below. A dull plant, and a slow starter, but it serves a purpose here. Continuing along the new level, there is *Feijoa Sellowiana*, from Brazil, flowering in late summer when it produces attractive waxy flowers of pink and white. It has survived

this winter, but next to it, *Cestrum Newellii* has succumbed. Then comes *Piptanthus nepalensis*, the evergreen Laburnum. There is nothing very special about it, but the bunches of yellow flowers are attractive in May, and the bright green foliage has been carried even through last severe winter. Between two of these shrubs, which grow here to a height of about ten feet, is the little *Tricuspidaria dependens*, a Chilean importation. It has dark evergreen foliage like that of the common Myrtle, and the flowers, beautiful white bells, appear in the late summer. It needs a dark wall to show it off and it is badly placed here, on the light yellow stone of the new building, against which the flowers are inconspicuous. A better species for this situation would be *T. lanceolata*, the bells of which are crimson. There was one in this garden a few years ago, but it was planted in the open and it needed shelter. As a small shrub to fill up a warm corner, it is one of the choicest things.

I suppose *Coriaria* hardly ranks as a wall shrub but we grow two species in the wall border here; *C. japonica*, with its big arched shoots covered with fernlike foliage which finish in spikes of coral-red fruits; and *C. terminalis*, which is smaller and bears fruits like strings of amber beads.

There is a *Jasminum humile* round the corner of the building, facing east, common enough, no doubt, but a plant of which I am rather fond. It is a sturdy grower, almost evergreen, and its flowers, which come freely in bunches in the late summer, have a size and substance and quality about them which rather distinguish it. Other things on this wall are species and varieties of *Cydonia* and *Cotoneaster* which everyone grows.

Turning the corner again, we come into the big new quadrangle, formed by buildings on three sides and open to the east. On the north side flourishes what I think is one of the most beautiful of all wall shrubs, *Plagianthus Lyallii*. This is a true wall shrub, not a climber, but needing support. It grows rapidly and flowers young. The foliage is a bright green which never dulls, and the flowers are borne in big clusters on slender stalks, in late June. They are an almost translucent white and they open wide, with yellow stamens. What the shrub is like on a sunny wall I cannot say, but it is a thing to remember for an old red or grey north wall. Close to it is a young *Hoheria lanceolata*, another New Zealand shrub and allied to *Plagianthus*. This is an evergreen, and it seems likely to do well in its rather unfavourable position, though the yellowish stone of the building is not the best background for either of them.

In the angle facing north and east, there is a shrub of which I am very fond, though I seldom see it elsewhere, *Eupatorium Weinmannianum*. The catalogues say it is very suitable for sheltered and seaside gardens, but here it has endured all the vileness of Thames valley winters in an almost sunless situation. It makes a graceful evergreen bush, and in autumn it is covered with flat heads of tiny white flowers which it continues to produce until stopped by frost. It was in full bloom

right up to the middle of last December. In cold winters, such as the last, it is cut back nearly to the ground, but it comes again, none the worse, except that the flowering season is somewhat delayed. As a cut flower it is particularly good, lasting for three or more weeks with a delicate and elusive scent like that with which the imagination endows Miss Matty's drawing room.

The east wall is paved to its foot and harbours nothing but *Hamamelis mollis*. The glory of the south wall is a great *Ceanothus floribundus*, but beyond this is an interesting evergreen, *Drimys Winteri*. It is perfectly hardy here, with large, Rhododendron-like leaves and pliant green branches with bright red terminal buds. The flowers are ivory white, borne in bunches and not showing their best against the light wall of the new building of the Manor, but it should be a joyous thing on an old red wall. Its leader was broken by snow a year ago, but it produced another last summer without difficulty.

Further on, again, is *Ceanothus rigidus*. It may be common enough but if so, I must have overlooked it. A stiff growing, evergreen shrub, more easily controlled than *C. floribundus* and its varieties, the twigs being tightly set with small, dark-green leaves, and studded with deep purple flowers in early spring. It is particularly good here on its light coloured background, but it would be almost equally effective, I think, on a red wall.

Leaving the building, the garden walls themselves are some of them stone and some brick. *Salvia Grahamii* is unfortunately placed on one of the brick walls, where its brilliant scarlet flowers are ineffective. It is regularly cut back by frost and as regularly comes again. *Stranvaesia*, I suppose is common enough; we have two varieties, both of which are decorative, whether in blossom, or when the autumn colours their leaves, or when their berries are bright in winter. For the rest, there are Magnolias which are not doing very well, and Jasmines, Cotoneasters, Escallonias, Pyracanthas, Forsythias, all of which grow easily enough. I have never attempted to grow the shrubs which eschew lime. Just as I will not grow things which are not winter-hardy, so I have not tried to make artificial conditions for shrubs which do not like the soil I have. There is no need when so many good things will accommodate us.

The garden at Holywell Manor is entering only on its ninth season. It is not yet full, and there are many things that I want to try. Across the road in my own garden is *Sophora tetaptera*, a twelve-year seedling which has not yet flowered, from a beautiful specimen, imported from New Zealand, which flourishes in the rectory garden at Wootton Courtenay, at the head of the Porlock Vale, in West Somerset. Its bunches of long, canary-yellow trumpets are magnificent in the spring, and the evergreen foliage and the general habit of the shrub are very attractive. In the Balliol College garden the Pomegranate, *Punica Granatum*, did fairly well on the west wall until recently. I know a very fine one covering a great space of sheltered east wall up to the first-floor windows of a house at Oare, in the Vale of Pewsey, which is

covered with scarlet flowers from June onwards for three months. There is a white flowered variety for red walls and a double-flowered variety for those who like double flowers—I don't, as a rule.

In a garden on Hinksey Hill and in the garden of St. Hugh's College, where the late Miss ANNIE ROGERS made so fine a collection of wall shrubs, *Carpenteria californica* flourishes, compact and sizeable, evergreen, and bearing large white flowers in late summer. It likes the shelter of a wall in the Thames valley and it likes the sun everywhere. Another Californian importation which I have not seen in Oxford, but one which flourished in the open in a garden of mine further west, is *Fremontia californica*. It produces large golden flowers over a long period, and given the shelter of a wall it should be worth a trial in many gardens, for all it asks is a sunny aspect and it really likes a chalk soil. Another big bush from my garden in the West which should make an attractive addition to any collection of shrubs on an east wall is *Azara microphylla*. Its small, glossy, evergreen leaves are gracefully arranged and it is almost the first of all plants to bloom, the tiny yellow flowers appearing in March and filling the air with the scent of chocolate.

Does Clematis come within the category of wall shrubs? There are so many good species and varieties but I only want to mention one which I have never seen except in my own garden. This is *C. Buchaniana*, a magnificent thing to run wild over a garden wall or a trellis. It is unlike any Clematis that I know; the flowers, which are produced in late summer, are in sprays, bell-shaped, the palest yellow in colour with a strong primrose scent.

I grew Lapageria, too, on an east wall, an evergreen with leather foliage and big wax-like flowers. There is a red variety for stone walls and a white one for red brick walls. I should rather doubt its hardiness in any but a very sheltered position, east of Devon and Somerset. But of all the wall plants that I have tried there is nothing, to my mind, quite so good for a stone wall of any colour except a red sandstone, as *Berberidopsis corallina*. It comes from Chile, it is a free grower, evergreen, with fleshy leaves, dark green on top and glaucous underneath. It likes a little shade and I grew it on a west wall. In the latter part of the summer it puts out flowers in clusters, deep crimson or blood-red, hanging on the ends of long stalks, and looking like bunches of Morella cherries. The glowing red flowers against the deep green leaves on an old stone wall are a sheer delight. I shall try it in Oxford one day, but I have a suspicion that it may not like my soil.

I have no idea how wall shrubs should be manured. My experience is that builders of all time have buried all the rubbish they could find round the footings of their walls. And as walls, particularly south and west walls, radiate considerable heat, all the conditions of wall gardening suggest that something is wanted which will retain moisture in the soil. In Oxford, "well-rotted farmyard manure," the gardener's ideal, is not easily come by, and I make a mixture of finely-divided

garden peat and about 10 per cent. of horn-and-hoof manure. This is applied as a mulch, in the spring ; in the autumn the borders are lightly forked, and sprinkled with the contents of the compost pit, the gardener's friend and the easiest thing to manage, notwithstanding all the mystery and magic which have become associated, to-day, with the perfectly normal processes of disintegration and decay which go on inside it.

SEALE-HAYNE AGRICULTURAL COLLEGE.*

THE College serves as the advisory and research centre for Cornwall, Devon and the Scilly Isles, and in consequence the research work is closely related to the requirements of the growers in these important horticultural areas.

The Potato crop occupies a position of importance in the south-west, particularly in West Cornwall where the earliest English Potatos are grown, and along the east border of Dartmoor where main crop varieties are favoured.

The use of virus-free "seed" is essential if maximum yields are to be obtained, and research work carried out during the past three years has shown that first quality seed Potatos can be grown in parts of Devon and Cornwall. The most important virus diseases are spread in crops by certain species of plant-lice or aphids and these insects do not move from plant to plant in situations exposed to strong winds and high humidities. Careful surveys have discovered the exact areas where high quality seed can be grown, and a Seed Potato Growers' Association has been formed to produce this special seed.

Potato blight outbreaks cause very serious reductions in yield in certain seasons which are associated with heavy losses in storage during the subsequent winter. The disease outbreaks are dependent upon weather conditions and these have been closely studied at Seale-Hayne College. It has been found that blight will appear within a week or so following periods of weather characterized by :

- (1) Minimum temperature—not less than 50° F.
- (2) Relative humidity persisting over 75 per cent. for at least two days.

By the use of these rules it has been found possible to make fairly accurate forecasts of the probable date of outbreak of the blight epidemic both in the early Potato crop in West Cornwall and the main crop areas of Devon so that control by spraying may be carried out. For example, in the eleven-year period 1929-1939 the rules were followed satisfactorily in seven seasons. In three seasons the blight epidemic was very

* The research work to which this article refers was conducted by the following members of the staff of the Seale-Hayne Agricultural College : A. BEAUMONT, A. BLENKINSOP, P. H. GREGORY, F. R. HORNE, L. N. STANILAND, and E. VANSTONE.

slight and the prescribed weather periods were not observed, so that no forecasts could be made.

It has also been found that the weather which governs the outbreak accompanies only a limited number of weather types as shown in the daily weather map, and this gives additional information in making the forecast.

Potato sickness in allotments and the intensive Potato growing areas has been traced to the presence of Potato eelworm, and surveys have shown growers which fields are to be avoided in Potato growing. Clean land is protected through the discovery that a thorough washing of infested seed in water removes the resting stage of the eelworm.

Winter Cauliflowers are grown both as the alternating crop with early Potatos in market gardens and in the rotations of mixed farms. Foreign competition after the Great War necessitated the replacement of the hardy yellow-headed 'Penzance' varieties by white-curdled French types. Although varieties from the French inland area of Angers are most suitable for the Midlands and eastern England, they succumb to ring-spot disease in the mild wet climate of the South-West and only the coastal growing 'Roscoff' varieties are found to be sufficiently vigorous. The original 'Roscoff' introductions matured entirely during February and March, but intensive plant-breeding has led to the production of varieties which mature in December, January and April. Production trials conducted in co-operation with the Cornwall and Devon County Horticultural Superintendents during the past three years have shown that "glut" periods on the market occur when two of the commercial varieties overlap in maturity. Series of related hybrid varieties with distinct periods of maturity are not prone to "glut" production. The overlapping of varieties has been shown to be due primarily to genetical causes which may be accentuated by difficult weather conditions. Unrelated foreign varieties intended for cutting during adjoining periods between November and January react differently to weather conditions, sometimes causing overlapping and in other years distinct intervals in the sequence of cutting. Overlapping which causes the most serious glut periods occurs when two strains are grown which have been picked out from one variety by mass selection for a few generations only.

Considerable deterioration in 'Roscoff' varieties has been caused by cross-pollination by bees from 'Penzance' and 'Angers' varieties. Through the application of Mendelian principles first-cross hybrids can be recognized and "rogued" by their dominant curly leaf habit.

Chemical analysis has shown the high nutritive value of the Cauliflower curd for human consumption, while as much as 6 or 7 cwts. of protein is available in the leaves for feeding to farm stock or for compost manufacture. Producing as it does about 5 tons of cut produce and a total weight of about 20 tons of plants, winter Cauliflowers remove particularly large quantities of lime, potash, phosphates and nitrogen. Spacing and manurial trials on early and late varieties of Roscoff Broccoli have shown that the distance of 27 inches square

is barely sufficient. The early varieties in particular respond to wider spacing and more liberal manuring.

That horticultural soils will deteriorate if manuring is unbalanced has been shown in an extensive investigation in which soil analyses have been compared with crop yields. Phosphatic fertilizers have been found to accumulate to excess so as actually to cause crop failures where the potash supply has been deficient, particularly on lighter soils.

Bulb crops are an important section especially in early cropping districts. Two of the most serious causes of loss in growing Daffodils have been the bulb eelworm and white mould.

The behaviour of bulb eelworm in relation to weather and cultural conditions, variety of bulb and other factors has been carefully studied and much information of immediate practical application by growers of *Narcissus* has been accumulated.

The whole technique of hot-water treatment of bulbs has been examined. Technical flaws in the heating apparatus have been investigated and the apparatus modified so that these faults no longer exist, thus bringing about real efficiency in the treatment. Small, cheap and efficient baths "easily home constructed" have been devised for the use of the small grower and the private gardener.

The date of treatment of bulbs in relation to the district in which they are grown and the variety, has been investigated, together with the methods of handling and storage of bulbs before and after treatment. Information now available permits of treating most varieties without causing the damage to the flowers which has in the past been a great disadvantage of the hot-water treatment.

Comparative field experiments in the control of white mould have been conducted over a period of years to measure the effect of these measures in improving the crop. Results have varied with different varieties of *Narcissus*. In the Daffodil 'Golden Spur' it has been shown that both flower and bulb crop can be very substantially increased by spraying with Bordeaux mixture, but unfortunately, however, this treatment delays flowering for a few days in the subsequent year and spraying is therefore not yet entirely satisfactory for this variety in the earliest flower districts. With the *Polyanthus Narcissus 'Soleil d'Or'*, in the Isles of Scilly, considerable improvement in both quality and quantity of flowers follows control of leaf diseases with Bordeaux mixture, and in this variety no retardation in flowering date is apparent in the following year.

This account is not intended to be exhaustive, but is an illustration of the type of work carried out at Seale-Hayne College. Some other work, not here described, has already been published in scientific journals.

PLANTS TO WHICH AWARDS HAVE BEEN MADE IN 1940.

* **Border Carnation 'Angela Hawtin.'** F.C.C. July 16, 1940, as a variety for exhibition. This variety received an A.M. in 1938 and is described in the JOURNAL, 68, p. 444. Raised and shown by R. Thain, Esq., Thatch Lossum, Shalford, nr. Guildford, Surrey.

* **Border Carnation 'Hilda Moody.'** A.M. July 9, 1940. As a variety for exhibition purposes. Flowers 3 inches diameter, of good form, and full centred, yellow ground flaked and suffused at the margins with bright scarlet. Calyx strong. Raised and shown by R. Thain, Esq.

* **Border Carnation 'Robin Thain.'** A.M. July 9, 1940. As an exhibition variety. Of good robust, compact habit, with stiff, erect flower stems. Flowers 3 inches diameter, full centred, clove scented, of good substance, white ground, flaked and flushed towards the margins of the petals with rich rosy-crimson. Calyx strong. Raised and shown by R. Thain, Esq.

* **Iris 'White City.'** F.C.C. May 31, 1940. A bearded variety. Plant vigorous; foliage 28 inches tall; flower stems 45 inches high, straight, ten-flowered; flowers large, well proportioned, scented. Standards domed, $3 \times 2\frac{1}{2}$ inches, satiny-white faintly flushed Flax blue (H.C.C. 642/3). Falls drooping, $2\frac{3}{4} \times 2\frac{1}{2}$ inches, somewhat waved, creamy-white with a very faint flush of Flax blue towards the margins, the reverse flushed Indian yellow (H.C.C. 6/3) towards the middle, beard Flax blue, tips of hairs Indian yellow (H.C.C. 6/1). Flowering from May 27. 'Pageant' × 'Pervanch.' Awarded the Dykes Memorial Medal for 1940. Raised by Mrs. O. Murrell and sent by the Orpington Nurseries Co., Orpington, Kent.

* **Rhododendron 'Betty.'** A.M. May 6, 1940. An evergreen hybrid Azalea of rather spreading and very free flowering habit; result of crossing *R. malvatica* and *R. Kaempferi*. Foliage oblanceolate, 1 to $1\frac{1}{2}$ inch long, dark green. The flowers are open funnel-shaped, $1\frac{1}{2}$ inch across, with five regular, spreading petals, arranged in twos in a flat-headed truss. The corolla is of a brighter shade of Neyron rose (H.C.C. 623), with a few darker spots on the upper two petals. Sent by The Knap Hill Nursery, Ltd., Woking, Surrey.

* **Rhododendron 'Butterfly.'** A.M. May 6, 1940. A *R. campylocarpum* hybrid of rather loose habit. The wide, flat bell-shaped flowers are $3\frac{1}{2}$ inches across, arranged in a compact, close truss of 12 to 14 flowers, being of a creamy-white shade, the upper petals spotted with blood-red; margins of the petals wavy. Leaves $4\frac{1}{2}$ inches long, oblanceolate, almost obtuse. Raised and sent by Messrs. Walter C. Slocock, Ltd., Goldsworth Nursery, Woking, Surrey.

* **Rhododendron 'Dr. M. Oosthoek.'** A.M. May 20, 1940. A deciduous Azalea of erect bushy habit, very free flowering, with 9 to 15 flowers in the trusses; flowers simple, open funnel shaped, 3 inches diameter, Mandarin red (H.C.C. 17/1), upper petal shaded fire red (H.C.C. 15) at the middle, of good substance and does not burn. Foliage deciduous, dark green, 3 to 3½ inches long, elliptical, obtuse. Sent by The Knap Hill Nursery, Ltd.

* **Rhododendron 'John Cairns.'** A.M. May 6, 1940. An evergreen hybrid of spreading and free-flowering habit, the result of crossing *R. malvatica* and *R. Kaempferi*, with dark green foliage, ½ to ¾ inch long, oblanceolate. The flowers are wide, open funnel-shaped, 1½ to 1¾ inch across, with five regular, spreading petals, arranged two or three in a flat-headed truss. The corolla is of a shade of Geranium lake between H.C.C. 20 and 20/1 with a few darker spots on the upper petals. Sent by The Knap Hill Nursery, Ltd., Woking, Surrey.

* **Rhododendron 'Peggy.'** A.M. May 20, 1940. A garden hybrid of uncertain parentage, first exhibited and named in 1930. Bush of good shape, vigorous and very free flowering, with close, well-arranged pyramidal trusses of 14 to 16 flowers. Flowers open basin-shaped, 4½ inches diameter, Phlox pink (H.C.C. 625/1); petals five, regular, of good substance, stiff, margins wavy; upper petal of a paler tone, with few faint primrose spots. Foliage dark green, 5 to 6 inches long, oblanceolate. Raised and sent by Messrs. John Waterer Sons and Crisp, Ltd., Twyford, Berks.

* **Rhododendron 'Red Star.'** A.M. May 20, 1940. A garden hybrid, the result of 'Mrs. Lindsay Smith' with 'Molière.' Bush of good shape, and very free flowering, with compact pyramidal trusses of 10 to 14 flowers. The flowers are open bell-shaped, 3 inches across; petals five, rich velvety crimson, upper petal spotted with black. Foliage dark green, 4 to 5 inches long, oblanceolate. Raised and sent by Messrs. M. Koster & Sons, Ltd., Boskoop, Holland.

* After trial at Wisley.

A FLORAL CLOCK.

By JOHN R. BAKER, M.A., D.Sc.

THE fact that plants in cultivation in this country start flowering in every month of the year suggested to the author that a floral clock might be constructed, with the twelve months represented by the hours, and with the plants so arranged that those in the part representing 1 o'clock flowered in January, those at 2 o'clock in February, and so on.

With the help of Mr. P. D. SAVAGE and Mr. D. HALL, the construction of such a clock was begun in the author's garden at Burnt Oak, Kidlington, near Oxford, early in 1938. A low stone wall was built in a circle, approximately 40 feet in diameter, to represent the edge of the face of the clock, and circular stones marked with the Roman numerals I to XII were put down just inside it, 12 o'clock being on the north side of the circle.

Between each numbered stone and the next is a circular bed, ringed with stones. In each of these beds is a shrub. The shrubs were so chosen that the one placed between the stones labelled I and II is a species which usually starts flowering in January, that between II and III in February, and so on. (See Fig. 88.)

In the centre of the clock is a sundial, and from a small circle round this project twelve narrow pointed flower-beds, edged with tiles, the points being directed towards the twelve shrubs. Each of these narrow beds contains small plants of two species. The bed which points towards the January-flowering shrub contains species which usually start to flower in January, and so on. The narrow beds represent the hour-hand of a clock in twelve positions half-way through each hour. All the space not occupied by the hands of the clock nor by the beds in which the shrubs are planted is covered with yellow gravel. It may be remarked that most of the plants in the clock were obtained from Messrs. JOHN WATERER, SONS & CRISP.

The intention is that the plants in each hand, and the corresponding shrub, should start to flower towards the middle of the proper month. The small plants are all perennials, for annuals and biennials are so dependent on the time of sowing of the seeds that if they were used the clock would not demonstrate the principles governing the flowering seasons of plants in nature, which is its purpose. In order to make every hand easily visible without the plants in another hand hiding it, it was necessary to choose species not attaining more than two feet in height, and so far as possible those of one foot and less have been chosen. This has severely limited the choice of plants and made certain months difficult.

No attempt has been made to choose short-flowering species,

which would no longer be in bloom after the end of the month during which the flower-buds burst. The start of flowering passes in a wave round the clock, but at any time of year some of the plants of earlier months may be seen to retain their blooms for a while.

The following is a list of the chosen plants, with their flowering seasons in their native homes. The first of the three species listed under each month is the shrub, the other two the small plants occupying the hand.

Month.	Species.	Native country	Start of flowering season in native country.	Authority for start of flowering season in native country.
JAN.	<i>Hamamelis mollis</i> <i>Galanthus nivalis</i> <i>Saxifraga Burseriana</i> x <i>Stribryni</i>	China Europe (incl. Britain), Turkey Eastern Alps (<i>S. Burseriana</i>) ; Balkans (<i>S. Stribryni</i>)	March January (in Britain) March (<i>S. Burseriana</i>) June (<i>S. Stribryni</i>)	12 13 14 8
FEB.	<i>Cornus mas</i> <i>Hyacinthus ciliatus</i> <i>Crocus aureus</i>	Europe (not Britain), Turkey Mediterranean Balkans, Turkey	March (in France) April (in France) February	5 5 11
MARCH	<i>Forsythia viridissima</i> <i>Omphalodes verna</i> <i>Saxifraga oppositifolia</i>	China Italian Alps, Jugo-Slavia, Hungary Britann., Alps, Pyrenees, etc.	March April (in Jugo-Slavia) April (in Britain)	3 10 7
APRIL	<i>Berberis Darwinii</i> <i>Alyssum saxatile</i> <i>Primula Auricula</i>	Chile South-Central Europe, S. Russia, Turkey Central and S. Europe	September or October April April (in France)	3 9 5
MAY	<i>Cytisus albus</i> <i>Lithospermum prostratum</i> <i>Saxifraga umbrosa</i>	Spain and Portugal France, Spain, Portugal, Morocco Pyrenees, Portugal, S.W. Ireland	April May (in France) June (in Pyrenees)	6 5 5
JUNE	<i>Buddleia globosa</i> <i>Dianthus barbatus</i> <i>Stachys Armeria</i>	Chile S. Europe to China Extra-tropical regions of both hemispheres	November July (in France) May (in Germany)	3 3 9
JULY	<i>Tamarix pentandra</i> <i>Calceolaria acutifolia</i> <i>Achillea Clavennae</i>	S. Russia, Turkey, Persia, Turkistan Patagonia Austrian Alps	April (or later) December July	11 11 10
AUGUST	<i>Hydrangea paniculata</i> <i>Origanum syriacum</i> <i>Sedum Sieboldii</i>	Japan and China Turkey Japan	July or August (in Japan) July or August October	3 3 11
SEPT.	<i>Ligustrum Oshikoui</i> <i>Anemone japonica</i> <i>Colchicum autumnale</i>	China Japan and China Europe (incl. England)	June August or earlier (in China) August (in England)	3 3 7
OCT.	<i>Fatsia japonica</i> Aster 'Victor,' prob- ably from <i>A. Novi-Belgii</i> <i>Imula ensifolia</i>	Japan Canada to Eastern United States (<i>A. Novi-Belgii</i>) S. Europe	November August (<i>A. Novi-Belgii</i>) August (in Austria)	11 4 10
Nov.	<i>Elaeagnus macrophylla</i> <i>Erica mediterranea</i> x <i>carnosa</i> <i>Iris unguicularis</i>	Japan and Formosa Portugal, Spain, S.W. France (<i>E. mediterranea</i>); for <i>E. carnea</i> , see below Algeria, S. Greece, Corfu	September or October (in Japan) Jan. (<i>E. mediterranea</i>); for <i>E. carnea</i> , see below December	3 5 3
Dec.	<i>Viburnum Tinus</i> <i>Erica carnea</i> <i>Helleborus niger</i>	Mediterranean Alps of Central and S. Europe Central Europe	February (in France) April January (in Alps)	5 14 14

The clock was finished and the plants placed in position by the spring of 1940, but it is hoped gradually to improve it, especially by eliminating any species which persistently flower at the wrong time in normal years, and replacing them by more satisfactory ones. When climatic conditions are exceptional, however, the clock must get out of time. This is not regarded as a defect, for it will be interesting to see what month of the year the plants make it when the weather is particularly unseasonable.

The author hopes that horticulturists will be kind enough to give suggestions for more reliable plants for any part of the clock. Suggested species must be tolerant of a calcareous soil. The most unsatisfactory month in the year is October, and advice on better small plants for the hand representing this month would be especially welcome. Both *Aster 'Victor'* and *Inula ensifolia* start too early. It is difficult to select a hardy perennial less than two feet in height which will start to flower during October.

It was not easy to find out the flowering seasons of many of the species in their native lands. The author wishes to express his great indebtedness to those who helped him in this respect, particularly Mr. A. W. EXELL of the British Museum, Mr. J. S. L. GILMOUR and the Herbarium Staff of Kew Gardens, and Dr. N. POLUNIN and others in the Department of Botany at Oxford.

The floral clock is instructive only when the flowering seasons which it exhibits are compared with the natural flowering seasons in the native habitats. The comparison shows that the great majority of the 36 species represented in the clock fall into one or other of the following five categories :

1. Plants which occur naturally in the temperate or sub-tropical parts of the northern hemisphere, and which start flowering in cultivation in Britain *at about the same time* as in their native lands.

The following fall into this category : *Galanthus nivalis*, *Crocus aureus*, *Forsythia viridissima*, *Alyssum saxatile*, *Primula Auricula*, *Lithospermum prostratum*, *Achillea Clavennae*, *Hydrangea paniculata*, *Origanum sylvestre*.

2. Plants which occur naturally in the temperate or sub-tropical parts of the northern hemisphere, and which flower *earlier* in cultivation in Britain than in their native habitat.

The spring-flowering plants of mountainous districts (*Saxifraga oppositifolia*, *Erica carnea* and *Helleborus niger*) fall naturally enough into this category, because their environment is so much less rigorous in cultivation during the early part of the year than in their natural habitat. Many other plants, however, tend to flower earlier in the year in cultivation for less obvious reasons. Examples are : *Hamamelis mollis*, *Cornus mas*, *Hyacinthus ciliatus*, *Omphalodes verna*, *Saxifraga umbrosa*, *Dianthus barbatus*, *Sedum Sieboldii*, *Fatsia japonica*, *Iris unguicularis*, *Viburnum Tinus*.

3. Plants which occur naturally in the sub-tropical parts of the northern hemisphere and flower there in the late spring or summer, and which start flowering in cultivation in Britain *later* than in their native lands. Presumably a longer warm bright period is necessary

to cause them to flower in this country than at the higher temperatures and in the more brilliant illumination of their native lands.

The following fall into this category : *Cytisus albus*, *Tamarix pentandra*, *Ligustrum Quihoui*, *Anemone japonica*, *Inula ensifolia*, *Eleagnus macrophylla*.

4. Plants which occur naturally in the temperate parts of the southern hemisphere, and which flower in cultivation in Britain about six months before (= after) the flowering time in their native lands.

The following fall into this category : *Berberis Darwinii*, *Buddleia globosa*, *Calceolaria acutifolia*.

5. Plants which owe their season of flowering to their being hybrids, the season being different from those of their parent species.

The following fall into this category : *Saxifraga Burseriana* \times *Stribryi* (= *S. Kellerei*), *Aster 'Victor'*, *Erica mediterranea* \times *carnea* (= *E. darleyensis*).

There remain two species which do not fit well into any of the foregoing categories : These are the British species *Statice Armeria* and *Colchicum autumnale*, which appear to flower later in cultivation than in the wild state. It must be allowed, however, that different authors give very different dates for the start of flowering of *S. Armeria* in nature.

It is conceivable that horticulturists and botanists interested in the relation between latitude and flowering seasons might find interest in corresponding phenomena among birds, and the author therefore ventures to quote two papers on the subject in the list of references (1 and 2).

A large floral clock would be very suitable for public display. If those in charge of any public garden were to decide to have one built, the author would hope to be privileged to keep in touch with those responsible for constructing it, so that knowledge of the most reliable species may gradually be built up by exchange of information. A floral clock in a public garden would be of perennial interest to visitors at all times of the year.

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BOOK REVIEWS.

"Wild Foods of Britain." By Jason Hill. 8vo. 94 pp. Ill. (Adam and Charles Black, London, 1939.) Price 2s. 6d.

This is a sensible little book, written by one who is under no illusions about the low nutritive value of most of the wild plants that have from time to time been recommended for food, and all the recipes in it, except where otherwise indicated, have been tried by the writer and his family and approved. It deals with vegetables, seaweeds, fungi, berries, flavourings, fresh-water fish and molluscs, gives precise directions for collecting, preparing and cooking these wild foods, and wisely adds a chapter of warnings and rejections. Most of the wild vegetable foods recommended are rich in vitamins and by providing salads and vegetables outside the garden may enable more space within it to be given to crops such as Potato, Carrot, Parsnip, etc. They may also add a little variety to meals, and that in war-time when meals are likely to become more and more uniform is not unimportant.

"Amateur Greenhouse." By W. E. Shewell Cooper. 8vo. x + 277 pp. (John Gifford, Ltd., London, 1940.) 2s. 6d.

A useful manual for the beginner in which the earlier chapters deal with the construction and care of greenhouses, management and cultivation under glass. Then follows a dictionary of the plants usually grown indoors, with notes on their treatment, with closing chapters in more detail about Chrysanthemums, Carnations and Roses under glass and on those Orchids which the amateur will find easy to handle.

"Fruit and Vegetable Preserving and War-time Gardening." By John Stoney. 8vo. 91 pp. (John Murray, London, 1940.) 1s.

Bits and pieces. Chapters on the bottling and drying of fruit and vegetables, on salads, on the principles of gardening, on soils and the cultivation of vegetables, which doubtless summarise the information which the author found valuable from his experience as Horticultural Instructor in Hampshire.

"Bio-dynamical Farming and Gardening." By Ehrenfried Pfeiffer, translated by F. Heckel. 8vo. 220 + vii pp. (Anthroposophic Press, New York, 1938.) 12s. 6d.

This book gives an account of theories and methods of dealing with the soil that are associated with the name of Rudolf Steiner. In so far as this movement encourages gardeners to conserve their waste vegetable matter and compost it for return to the soil, in so far as it insists on the value of humus in the soil, it is helpful. But the practical gardener can ignore all the "notions" about the sympathetic action of various plants that is associated with the Rudolf Steiner system, just as the orthodox man of science is sceptical of its theories and distrustful of the experimental figures that are provided to support them. In these days, when the march of science—its results and not its methods—has habituated everyone to wireless, vitamins, viruses and the like, matters which cannot be made intelligible except to the specialist, everything becomes equally credible. Hence the marvellous results promised by the application of "Biological Dynamic Preparations Nos. 502-507" get believed in. To the psychologist it is interesting to note how in this atmosphere of universal credulity all the age-long superstitions, like the influence of the moon, sympathetic medicine and black magic, rise again.

JOURNAL OF THE ROYAL HORTICULTURAL SOCIETY

Vol. LXV

Part 10



October 1940

THE SECRETARY'S PAGE.

RED CROSS SALE, BIRMINGHAM, OCTOBER 10 AND 11, 1940.

THE special attention of the Fellows and Associates of the Society living in the Midlands is drawn to the advertisement of the Red Cross Sale on the cover of this JOURNAL giving the particulars of the time at which the Sale in Birmingham is to be held. The Sale will be opened by the Lord Mayor on Thursday, October 10, at 11.30 A.M. and will last two days. It will be held in the Town Hall, which has been kindly placed at the disposal of the Society by the Corporation.

A strong local Committee has been formed to assist in the local arrangements that are being made, and the Society's thanks are due to these willing collaborators.

The articles for sale will be similar to those in the London Sale, with the exception that there will be no Orchids or pictures. Special arrangements are being made for the books to be on view, and at the Town Hall itself there will be a stall at which many useful garden articles and fruit that cannot conveniently be included in the Auction will be able to be purchased, so that all those attending the Sale may have an opportunity of purchasing and taking something away.

The total number of lots of plants, fruits and books will be about 1500, of which the books will form about 200.

The Catalogues of the Sale are available either from Mr. E. S. WHITE, Honorary Secretary to the Local Red Cross Sale Committee, Parks and Cemeteries Department, 161 Corporation Street, Birmingham, or from the offices of the Society.

The location of the third Sale in aid of the Red Cross will be, it is hoped, in Manchester on November 5, 6 and 7.

RED CROSS SALE, LONDON.

The Red Cross Sale which was to have taken place at Vincent Square, Westminster, on September 24, 25 and 26 could not be held and it was decided it should be conducted by post. The Catalogue which is sold for the benefit of the Red Cross, post free, may be had from the Secretary, Royal Horticultural Society, Vincent Square, Westminster, S.W. 1. Each Catalogue contains a form for the making of bids and completed forms should reach the Honorary Auctioneers not later than October 19, but earlier if possible. The Auctioneers naturally reserve the right not to accept the lowest or any bid. The Organizing Committee hopes that there will be a widespread demand for such Catalogues and that all interested in gardens will do their utmost for the success of the Sale notwithstanding the altered conditions. Many Fellows have responded to the appeal sent out in September and have applied for Catalogues and these Catalogues have been sent. It is hoped to write a personal letter to all Fellows who have applied for a Catalogue pointing out these new conditions and asking them to be so good as to forward their bids. It is hoped that Fellows who have received Catalogues will draw gardening friends' attention to them and use their persuasive powers to promote the success of the Sale. At the same time the Organizing Committee desires to thank all the donors of gifts and to say that they will be informed personally regarding the disposal of their gifts.

R.H.S. SHOW PROGRAMME.

It is very much to be regretted but it has been deemed advisable to cancel the Flower Show and the Fruit and Vegetable Show which were to have been held on October 8 and 9. Whether it will be possible to hold a further Show this year depends on circumstances, and announcements to this effect will be made in the Press.

LECTURE PROGRAMMES FOR THE AUTUMN AND WINTER.

Applications have been coming in for lectures for the autumn and winter months on food production, and Fellows are reminded that there is a limited number of lecturers and their time is being booked up very fast, but it is still hoped that as much use as possible will be made of the Lecture Panel organized by the Society in co-operation with the Ministry of Agriculture. The lecturers and demonstrators give their services free and only the cost of out-of-pocket expenses has to be met. Applications should be addressed to the Secretary, Royal Horticultural Society, Vincent Square, Westminster, S.W. 1, giving the time, date and location of the lecture or demonstration.

ADVICE ON TECHNICAL SUBJECTS.

All requests for horticultural advice, advice on diseases, soils and manures and for the identification of plants should be addressed to

The Director of the R.H.S. Gardens, Wisley, nr. Ripley, Surrey. All fruits for naming should also be sent to the Director of the Society's Gardens at Wisley, and not, as has been formerly the practice, to the Society's Offices in London. Fellows and Associates are reminded of the following rules for sending plants or fruits for identification.

1. Send a good strong piece, bearing leaves and at least three blossoms. Cut the flowers in the bud stage or they will be over before they arrive. It is rarely possible and never wise to name a plant from its leaf alone, and poor specimens with only one blossom make identification unnecessarily difficult.

2. Wrap in soft paper and then pack in moss or even damp grass. Do not use cotton wool. Specimens should not be pressed.

3. Give all the information you can respecting the specimens, including the size of the plant and the country of origin, or natural habitat, if known. With a garden plant, say where it is growing, greenhouse or open, sun or shade, etc.

4. Of fruits, send at least three perfect specimens of a variety. Do not send until fruits are mature, and then choose specimens representative of the particular variety. Avoid sending bruised, diseased or abnormal fruits. Include with each variety a typical shoot with foliage. In the case of Apples and Pears number each variety, preferably in Roman figures, by marking the skin with a hard pencil, and keep a record of the tree from which it is gathered. Labels are often displaced during transit. Wrap each fruit in paper and pack it carefully and securely in wood-wool or similar material. Cardboard boxes are usually crushed in the post, while scented soap boxes taint the fruit and obscure the characteristic flavour. Give all the information you can respecting the age of the trees and how they are grown, e.g. indoors or out, as cordons, bushes or standards, etc.

PUBLICATIONS.

The recent pamphlet issued by the Society, and approved by the Ministry of Agriculture and Fisheries and the Ministry of Food, entitled "Simple Vegetable Cooking," has met with a very ready response, and the Society has been congratulated on its simplicity and utility. Copies may be had on application to the Secretary, price 4½d., post free.

"The Genus Tulipa" has now been published and is receiving very favourable and congratulatory reviews on all sides. This publication is likewise obtainable on direct application to the Secretary, price £1 2s., post free.

WOMEN GARDENERS.

The following notice, which may be of interest to Fellows, has been received from the Ministry of Agriculture and Fisheries (Women's Land Army) :—

Members of the Women's Land Army who have had a short horticultural training are available for employment as under-

gardeners. A condition of their employment is that the greater part of their time is spent in vegetable and fruit production.

Application should be made to the Women's Land Army County Office, or to the Headquarters at Balcombe Place, Balcombe, Sussex.

Further, from a notice from the Women's Farm and Garden Association we learn that there is an Apprenticeship Scheme for six months for girls to head gardeners on approved gardens and estates. Girls not under the age of eighteen who can prove to the satisfaction of the Women's Farm and Garden Association that they are suitable for horticultural work and are unable to pay ordinary fees for tuition can be apprenticed under certain conditions. All particulars can be obtained from The Women's Farm and Garden Association, Courtauld House, Byng Place, W.C. 1.

AGRICULTURAL WAGES.

With regard to the new agricultural rate which came into force on June 30, persons who employ gardeners and who are in doubt whether their employees come under the Act or not should make inquiries at the Ministry of Agriculture and Fisheries, King's Buildings, Dean Stanley Street, Westminster, S.W. 1. The new rates make no change in the definition of an agricultural labourer. The Society understands that persons engaged upon work in private gardens are not employed in agriculture within the meaning of the Agricultural Wages Regulation Act, 1924, unless the garden is engaged mainly in vegetable production. Employment in agriculture is defined in the Act as including employment in connection with the use of land as orchard land, market gardens or nursery grounds.

SEED SAVING.

Fellows, Associates and Affiliated Societies are reminded of the importance of saving such vegetable seeds as they can. It would be a wise precaution to select a few good specimens of Carrots, Onions, Parsnips and Beetroots as they mature to place in store for planting out in spring to produce a crop of seeds in 1941.

WISLEY IN OCTOBER.

THIS month is associated in gardens with the last of the autumnal flowers, such as the border Chrysanthemums, Dahlias, Michaelmas Daisies, Crocus species, etc., but perhaps still more with coloured leaves and ripe berries on many trees and shrubs both native and introduced.

In each of these broad groups there will be plenty to see at Wisley,

provided the weather is kind, and besides them a variety of other interesting and ornamental plants.

Under the south wall of the laboratory near the entrance gates, and also on a bank in the Award of Merit garden, is the handsome *Amaryllis Belladonna* with umbels of large pink Lily-like flowers, while a shrub to be noted on the west front of the building is *Clerodendron Bungei (foetidum)*, possessing heads of rosy flowers at the end of each shoot.

Below the steps we may look into the first glasshouse, where the hybrid red, yellow, and orange-flowered Abutilons are still blooming, accompanied by the Nerines, both species and hybrids, in tones of scarlet, pink, and almost white, the conspicuous rosy-red *Oxalis Bowiei* and other species of this predominantly South African race, tall yellow *Calceolaria Pavonii*, and probably a splash of blue from bushes of *Lithospermum rosmarinifolium* or *Aster Pappei*. Further on, in the larger Temperate house, are various Fuchsias including the small but freely flowering *F. parviflora*, besides taller species, and the creeping *F. procumbens* with its red berries hanging over the wall of the central bed. Here too is the royal purple *Tibouchina semidecandra*, *Cestrum aurantiacum* with an inflorescence of Buddleia-like flowers, the long rose-pink bells of the climbing *Lapageria rosea*, and Pelargoniums in variety.

From here we may ascend the steps, pass through the collection of Conifers, and so reach the floral trial grounds where the perennial Asters (Michaelmas Daisies), varieties of the dwarfer but equally useful *Aster Amellus*, Dahlias, Chrysanthemums, varieties of the hardy *Fuchsia magellanica*, and finally the Roses will all be found. By proceeding up the broad King's Avenue we can then reach the Alpine house, which will be worth walking through to see the few plants still flowering, such as the trailing *Campanula cashmiriana*, *Limonium (Statice) ornatum* with its slender stem of pinkish flowers, a yellow South African bulb, *Hypoxis villosa*, and the orange berries of the tufted *Nertera depressa*. Behind the house are beds containing the Crocus species, of which several, including *C. laevigatus*, *C. speciosus*, and *C. zonatus*, bloom this month.

Going down to the rock garden a larger selection of autumnal flowers can be found. Some of the most conspicuous are the Gentians, such as *G. Farreri* and the rich blue trumpets of *G. sino-ornata*, species of creeping Polygonum, the blue *Cyananthus microphyllus* and *G. Sherriffii*, natives of the Himalaya or Tibet, golden Crocus-like *Sternbergia lutea*, the first of the Snowdrops, *Galanthus Olgae*, the invaluable *Schizostylis coccinea* from South Africa which is so useful for cutting for house decoration, and the last blooms on the scarlet *Zauschneria californica* and creeping *Verbena chamaedryfolia*. From these examples it may be realised that the rock garden is by no means yet without colour, and there are also other plants to be found within its area which have not been mentioned.

In the Wild Garden flowers are not so plentiful, but include the autumnal *Cyclamen neapolitanum*, the pendent white tassels of *Cyrilla*

racemiflora, a North American shrub suitable for woodland conditions, several Hydrangeas, besides a large patch of *Gentiana sino-ornata*. This is to be seen among the Vacciniums, whose leaves now begin to assume their annual tints of brilliant red for which they are justly renowned when planted where conditions are suitable. The principal species concerned are *V. virgatum* and *V. corymbosum*, with *V. canadense* and *V. pennsylvanicum* close by in paler garb, but besides these *Lyonia (Pieris) Mariana*, *Disanthus cercidifolius*, *Enkianthus perulatus*, *Oxydendrum arboreum*, and the peach-tinted *Acer griseum* are all notable for this rich colour before the leaves finally fall. A tall specimen of *Hamamelis japonica* too is very striking when covered with pale yellow Hazel-like foliage.

In the Heath garden there is little of outstanding interest, except for some of the late sorts of the Cornish Heath, *Erica vagans*, and that fine double pink-flowered form of the Common Ling, known as 'H. E. Beale,' which may not yet have completed its season.

The berried shrubs in Seven Acres are, however, at their best in October, especially the numerous Berberis species and hybrids, *Hippophaë rhamnoides*, the Sea Buckthorn, with quantities of orange fruits clustered thickly along the branches, many species of Crab Apples, including the bushy *Malus Sargentii* and small trees of *M. baccata*, the Siberian Crab, and others, all laden with roundish red fruits. Some of the Cotoneasters which were not damaged by the severe winter are also very noticeable now, besides several Euonymus species, and the evergreen *Ilex glabra*, the Ink-Berry, with small black berries.

Nor is coloured foliage lacking here, for gradually throughout the month the Dogwoods, such as *Cornus alba* and *C. australis*, Maples, including *Acer Ginnala* and *A. circinatum*, with Berberis, Euonymus, Prunus, Rhus, and Viburnum species, all change to their varied autumnal tints and provide a fresh scene each week.

In Howard's Field beside the river bank many of the large collection of Rose species are laden with their bright hips, usually in some tone of red or scarlet; for their ability to thrive in poor soils these ornamental, easily grown shrubs should be freely planted.

Return may be made by the herbaceous border, where such good plants as *Verbena bonariensis*, *Chrysanthemum uliginosum*, and the pink *C. rubellum*, *Salvia uliginosa*, the dwarf *Dracocephalum 'Vivid'*, and Rudbeckias are still putting out flowers. In the vegetable ground in Wisley village there is a demonstration plot of varieties of Kale to be inspected by those interested, as well as various other sorts of winter vegetables, such as Broccoli, Carrots, Celery, Brussels Sprouts, Savoys, Parsnips, Garden Swedes, and Turnips, from which suggestions as to suitable varieties and methods of cultivation may be gleaned.

THE KITCHEN GARDEN IN OCTOBER.

THE work of planting Spring Cabbages, if not completed, should be hurried on and ample quantities planted to ensure an adequate supply. Later in the month the rows should be inspected and any gaps made good. A little soil should be drawn up to the stems to keep the plants from being blown about by autumn winds.

The earthing up of Celery should be completed as soon as possible, and a slight dusting of soot given when the work is completed will prove beneficial.

The lower leaves of Brussels Sprout plants should be removed if they are becoming yellow to enable more light to enter and air to circulate round the Sprouts now forming.

The leaves of Cauliflowers which are forming their curds should be broken over as a protection, or alternatively they may be tied together to keep the weather from spoiling the heads.

Asparagus foliage should be cut down to ground level towards the end of the month. Lettuce plants from seeds sown early in the month should be planted out as they become ready, taking care that they are not planted too deeply but left swinging rather loosely in order to avoid danger from over-dampness during the winter months.

Seedling Cauliflowers may be pricked out in cold frames and a sowing of a suitable variety of Lettuce, such as 'May Queen' and 'Feltham King,' may be made to provide successional crops.

All unripened Tomatos should now be picked and either placed in a light, airy place to ripen or stored away by wrapping them in paper and keeping them in a dry atmosphere and equable temperature to ripen slowly.

All the work of weeding and general cleaning up among crops should be done before the cold weather sets in, as not only are these tasks more unpleasant in cold, wet weather, but the roots of the weeds grow much faster after the rains of autumn and it is more difficult to remove them without disturbing the surrounding crops if they are left too long.

Carrots and Beetroots should now be lifted carefully with a fork and stored either in boxes or heaps in a dry frost-proof place, and some protective material, such as sacks, straw or bracken placed over them to keep them from damage by winter frosts. Parsnips, however, are an exception and should be left in the ground until they are required for use.

The late Potato crops should by this time be ready for lifting and may be stored either in a similar manner to that recommended for Carrots, or larger quantities may be stored in a clamp in the open.

As soon as the skin of the Apples and Pears, gathered for storing, is dry, the fruits should be wrapped, using the thin oiled paper wraps

made for the purpose. Wrapped fruits keep longer than those which have not been wrapped, and the paper helps the fruits to retain their juice and at the same time stops disease from spreading in the store. A good store is one in which a low temperature can be maintained, because the lower the temperature the more slow are the chemical changes taking place inside the fruits. A good temperature for the natural storage of Apples is round about 35° F. and for Pears slightly higher at 40° to 45° F. Moisture in the store is also important as water is necessary to keep the fruits alive. Fruits stored in a dry place soon shrivel. Therefore, maintain a slightly moist atmosphere by occasionally damping the floor. Excessive moisture must be avoided as this encourages fruit rots. A still atmosphere in the store is desirable and it should only be necessary to use the ventilators to regulate the temperature.

Where there is no room or shed in which the above conditions could be provided, pack the Apples in wooden boxes and then stand the boxes on some straw under a north wall. Provide good insulation by a thick layer of straw and then cover with a tarpaulin to keep everything underneath dry.

Root-prune vigorous-growing Cherries, Plums and Peaches to induce fruit bud formation. Dig a trench around the tree at a distance of 2 ft. to 3 ft. from the main stem. Cut back all thick lateral roots to about 2 ft. from the main stem, taking care not to injure the fibrous roots. Do only one-half of the roots of old trees this season and the other half next ; this is to avoid a severe check. Fill in the trench and make firm. Young trees can be lifted out of the ground, their coarse roots cut back, and then replanted.

Peach trees, under glass, which have not made much growth, can be assisted back to health by removing the top soil from the border and replacing with a good mixture consisting of fibrous loam with which some bone-meal, mortar-rubble, and wood ashes have been mixed. Go over the bunches in the late viney, removing any berries which have commenced to damp ; damp the house down when weather conditions permit, but see that it is dry by nightfall.

GAULTHERIA YUNNANENSIS (FRANCH.) REHD.

By FRED STOKER, F.L.S., V.M.H.

Gaultheria yunnanensis (Franch.) Rehder appears to have been discovered by the Abbé DELAVAY in July 1894, "in the woods near Tchen-fong-chan" (Yunnan). A specimen was sent to Paris and described by FRANCHET, who gave it the name *Vaccinium yunnanense*.¹ In his account he gives the unripe capsule as being "semi-included" (that is, within the calyx), an arrangement which, as REHDER² points out, is not indicative of *Vaccinium*. In that genus the ovary is beneath the calyx, and consequently any part of the latter organ which survives until the fruiting stage can only be attached to the apex of the fruit, which, incidentally, is not a capsule in *Vaccinium* but a berry. REHDER, therefore, rectified the generic name, retained the specific, and designated the shrub *Gaultheria yunnanensis*, for *Gaultheria* is the only Ericaceous genus which exhibits a capsule enclosed in a swollen calyx.

The full synonymy of the species is given by REHDER³ and need not be repeated here. One name in it, *Gaultheria laxiflora*, Diels,⁴ may, however, be mentioned, for by it *G. yunnanensis* is commonly, but wrongly, spoken of.

The following description is taken from fresh material for which I am much indebted to Sir WILLIAM WRIGHT SMITH, to whom, and to Mr. ROBERT M. ADAM, I am also grateful for the excellent photographs illustrating this note, Figs. 96 and 97.

Gaultheria yunnanensis is a graceful though rather straggly evergreen shrub which, according to FOREST, reaches a height of 1 to 1.5 m. in nature. The branches are arching, rounded, smooth and, in youth, red where exposed to the sun. Leaves alternate, petiolate, oblong-lanceolate to ovate-acuminate, cordate, 4 to 12 cm. long, 1.5 to 4.5 cm. wide, finely serrate (especially when young), the serrations sometimes tipped with short bristles; smooth except for a few glandular bristles on the underside of the midrib and veins, reticulate, leathery, and smelling of wintergreen when crushed. On the younger parts of the shoots the leaves are so disposed that their blades are held on a plane parallel to the direction of the shoot to which they are attached. Inflorescence: The flowers are borne in axillary and terminal racemes from previous season's growths and also, on the same growths, solitarily from the last one or two axils. The stalks of the axillary racemes and of the solitary flowers are curved round the leaf-stalks in such a manner as to bring the flowers beneath (or behind) the leaves. Axes of racemes and pedicels smooth, the latter 4 to 10 mm. long and, on the terminal racemes, issuing from the axils of lanceolate-acuminate bracts. Calyx, subtended by two ovate, slightly overlapping bracteoles, is 3 mm. long, cut into 5 ovate, pointed, ciliate,

overlapping lobes and, in the fruiting stage, becomes swollen, succulent and completely encloses the capsule. *Corolla* widely campanulate, smooth, 5 mm. long, 6·5 mm. across mouth, white blotched or longitudinally banded with brown externally, brown-stained within; divided for nearly half its length into 5 broadly ovate, blunt or sub-acute, slightly recurved lobes. *Stamens* 10; *anthers* 1 mm. long, brown, 4-awned, dehiscing longitudinally; *filaments* of the same length, smooth, flattish and expanding from above downwards. *Style* (and its almost undifferentiated extension to form the *stigma*) smooth. *Ovary* 3 mm. across, globose, sericeous. *Fruit* (capsule enclosed in fleshy calyx) 5 mm. or more in diameter, depressed-globose, black.

Distribution.—In addition to the classical station in Yunnan, *Gaultheria yunnanensis* has been reported from several places in the neighbouring province of Kwei-chow. Mountain woods appear its favourite resort.

The shrub begins to flower in May and continues to do so for some months. Consequently it has the unusual property of showing both flowers and ripe fruit in August.

Sir WILLIAM WRIGHT SMITH tells me that, in the open at Edinburgh, *G. yunnanensis* survived last winter, though it was severely cut. As many shrubs which we had looked upon as absolutely hardy were killed outright by the exceptionally cold conditions then prevailing, this plant may justifiably be considered as relatively hardy.

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1. FRANCHET, A. (1895), in Morot, *Jour. de Bot.*, **9**, 368.
2. REHDER, A. (1934), in *Jour. Arnold Arboretum*, **15**, 282.
3. DIELS, L. (1900), in Engler, *Bot. Jahrb.*, **29**, 515.

SEED AND FOOD IN WAR-TIME.

By M. B. CRANE,

John Innes Horticultural Institution, Merton.

As a war measure we have been asked to save seed of various garden crops. This calls for caution and judgment. It will remind most of us that one of the first things we were taught was that unreliable and inferior seed is dear at any price, and long experience has led us to accept this as a sound principle. Obviously the value of any seed we save will depend upon its purity and freedom from disease. Poor seed, whether poor because disease-infected, or from the results of indiscriminate cross-pollination, will not give those maximum crops of food which it is now so desirable to obtain. It is therefore important that the necessary steps are taken to ensure that any seed we save will maintain the vigour and high yield which are characteristic of our leading varieties.

Plants grown from seed are of two kinds : those which will set seed with their own pollen and which are naturally self-pollinated, and those which must be or are naturally cross-pollinated. To maintain a variety or strain of the cross-pollinated kind a number of precautions are necessary, in particular, any inter-crossing which will lead to contamination and deterioration of the stock must be rigorously guarded against, for if indiscriminate crossing is allowed both the yield and quality of the ensuing crops will certainly suffer, no matter how skilfully these crops are cultivated, and in war-time we must not suffer poor crops, when by taking a few simple precautions we can grow good crops.

To obtain seed and maintain a variety in crops which are naturally self-pollinated is easy. All you need to do is (i) to begin with a pure stock, (ii) keep the plants free from disease, (iii) weed out any rogues and other aberrant types ; and then let the seed set and collect it when ripe. Naturally self-pollinated garden crops are Peas, Beans and Tomatos. In normal times it may be a wise precaution, even in these crops, to arrange for varietal isolation, but in practice natural cross-fertilization in these crops is so low that it is not likely seriously to damage the first generation. In these crops the flowers are self-fertile and the important reproductive organs are protected by the other parts of the flower ; in the rare cases where cross-pollination does occur, it usually results from insects damaging the flowers at an early stage and exposing the reproductive organs before self-fertilization has taken place. In Peas, for example, the keel of the flower surrounds the reproductive organs so that self-pollination and self-fertilization is enforced. In the Tomato the stamens, or male organs, are joined

together to form a protective and isolating cone round the female organ, the stigma. The surface of the stigma lies slightly below the apex of the cone and close to the pores in the male organs from which the fertilizing pollen is liberated. The Tomato is therefore well adapted for self-pollination, and when the flowers are in a receptive condition any mechanical movement of the plant further assists in pollination. Hence moderate syringing of the plants, or tapping the supporting wires, is sound practice. In ordinary cultivation this practice helps to set the fruits, and it is of even greater value when large quantities of seeds are required, than when the fruits are wanted simply for eating or marketing.

Most of our vegetable crops, however, are subject to natural cross-pollination. In this class are such important crops as Beets, Cabbages, Carrots, Celery, Cucumbers, Leeks, Lettuces, Marrows, Onions, Parsnips and Turnips, and if we save seed of these from our gardens only one variety of each should be grown as a seed crop, so that pollination is limited to the plants within the variety itself.

With roots, bulbous and foliage crops, such as Carrots, Onions and Lettuces, when more than one variety of each is grown, the necessary isolation can be achieved if only one variety of each is allowed to flower and run to seed. Where, however, the edible crop is a fruit, as in the vegetable Marrow, only one variety can be grown as a food crop if seed is to be saved. Edible and ornamental Beets must not flower together, and the different members of the Cabbage tribe (Brussels Sprouts, Cabbages, Savoys, Kales, Cauliflowers and Broccoli) must be completely isolated at the time of flowering or the consequences of inter-crossing between these crops may be disastrous. Indeed, the greater the differences between the varieties or kinds of plants which are able to cross-fertilize each other, the greater is the disaster if they are allowed to do so.

It is impossible to say precisely what distance plants must be apart to guard against contamination due to crossing. This will depend to some extent upon whether pollination is effected by insects, as in Marrows and Cabbages, or whether it is carried out mainly by the wind, as in Beets. Again, with insect-pollinated plants, if only a few plants are grown, as will generally be the case in our gardens, contamination is likely to be more severe, and may even come from a greater distance, than when a crop is grown for seed on a large scale. For example, it has been found in clover that with comparatively few flowers contamination from a distance of 350 yards was as great as 45 per cent., but with a profusion of flowers contamination from 300 yards was only 1·5 per cent. That is to say that a mass of flowers, by holding the bees to a particular area, give a more effective isolation than distance unless the distance is very great. In commercial seed growing this and other measures of isolation are adopted which cannot be carried out within the confines of our gardens, and even when we have done all we can in our own garden to save seed that will maintain vigour and purity, it may be necessary to find out what crops are

running to flower in neighbouring gardens. Otherwise, if we are growing cross-pollinated crops, our own precautions may be in vain.

So much for distant crosses ; at the other extreme we find a fresh set of difficulties caused by very much alike varieties. In the first place there is confusion due to the multiplication, wilful or inadvertent, of garden names. Such multiplication should, as far as possible, be stopped by organized action on the part of some central authority, as, indeed, it is in the case of Potatos : and lists of "too much alike" varieties should be published from time to time. There is, however, one type of small variation which is justifiable and may in some cases be very valuable ; this is where a strain is selected for particular local conditions and though it may not differ markedly in appearance it will be found to yield appreciably better results in a particular locality than a related strain brought in from some other part without reference to local adaptation.

INBREEDING AND OUTBREEDING.

So far this note has dealt with the precautions which must be taken to maintain the yield, vigour and other characters of a particular strain or variety. Established varieties of self-fertilizing crops breed true, as long as self-fertilization continues, and foreign pollen is excluded. With self-fertilizing plants the seed of commerce is therefore bound to be inbred seed, and many varieties of such crops as Peas and Tomatos have been maintained by close inbreeding, *i.e.* by self-fertilization, over very long periods of time.

But as we have said, the majority of our garden crops are subject to natural cross-fertilization, and as we have seen, seed harvesting from them calls for more exacting measures, and unless the seed saver is prepared to take the precautions necessary to prevent indiscriminate outbreeding he will be wise to leave the growing and harvesting of such seed to the professional seed-growers. Indeed, with cross-fertilized plants, I think the best plan the amateur seed grower can adopt in war-time is to regard any seed he saves as a reserve supply. If he finds he can obtain the seeds he requires from the commercial seed firms, he will be well advised to do so. Should he not be able to get supplies he can then fall back on his own saved seed.

In cross-fertilized crops, varieties are maintained by varietal isolation. This means that outbreeding is limited to the inter-breeding of like individuals, that is to say to different plants within the variety. If outbreeding is uncontrolled and is allowed to extend to the inter-crossing of different varieties or different kinds of plants : as for example, between a globe and a long Beetroot, a stump-rooted and a long-rooted Carrot, or between a Cabbage and a Brussels Sprout, the good qualities of the variety, which it may have taken years of careful work to establish, will be lost and in most cases uniformity will be replaced by a medley of inferior types. On the other hand, often in cross-pollinated plants the degree of outbreeding which occurs from

the inter-crossing of different individuals within a stock or variety is, as we shall see later, of great value in maintaining vigour in the stock.

Another point of importance is that the seed saver should not just collect seeds from a few plants which may be the only ones to have seeds at the end of the season. If he does, he may unconsciously be selecting for late maturity and other undesirable characters. The best plan is to devote a part of a row entirely to seed production, and to see that these plants are true to type and free from disease. This of course applies to self- and cross-fertilized crops alike.

A SHORT CUT TO BIGGER AND BETTER CROPS.

To deal with the different ways by which high yield and other outstanding qualities of our leading varieties of garden crops have been obtained would go beyond the scope of this note, but breeding and selection have played major parts, and many examples could be quoted where even a moderate improvement in a crop which has been attained by breeding and selection has run into huge sums in the economy of a nation. In most cases, of course, this has only been achieved after many years' work, but in some plants we can take a short cut to crop improvement.

Now, when we cross two inbred strains or varieties of plants together we usually find that the first hybrid generation is more vigorous than either of its parents. Very often this hybrid vigour is accompanied by a higher yield and other economic advantages, and in plants so diverse as Maize and forest trees this hybrid vigour has been commercialized with great profit and success.

In Maize the higher yield and other advantages associated with hybrid vigour have been commercially utilized in America on a gigantic scale, and a number of hybrids have been introduced for general cultivation both from experiment stations and from commercial seed companies. In addition to giving a great increase in the yield of Maize, hybrid generations have been found which are more uniform and more able to withstand drought, wind, diseases, insect pests and other unfavourable conditions than the best standard varieties, and as a consequence the acreage of hybrid Maize grown in America has doubled or trebled every year during the past three or four years, until over 20,000,000 acres were planted with hybrid seed last year. This is all the more remarkable, for although many years of research had gone before, hybrid Maize was almost unknown to the average Maize grower four years ago. By showing a profit both to the seed raisers and to the commercial Maize growers, it is clear that the utilization of hybrid vigour in Maize has come to stay, and the acreage grown is likely to extend year by year.

Another crop in which hybrid vigour is attracting attention in America is Sorghum, where in hybrid generations an increase in yield of grain approximating to two and a half times that of the higher producing parent used in making the hybrid generation has been obtained.

In the Egg plant again large increases in the yield of hybrid generations have been reported and commercialized in Japan.

In horticulture hybrid vigour is only just beginning to receive direct attention, but in certain crops it has been unconsciously utilized for centuries. Many of our asexually propagated crop plants have been selected for vigour of growth, high yield, etc., which are to a large extent the result of hybrid vigour. Among such plants are Potatos, Apples, Pears, Strawberries and Raspberries. Hybrid vigour in these crops is evident from the fact that they invariably lose much of their vigour when inbred, but the vigour is of course maintained in varieties by the horticultural practice of vegetative propagation. It is often stated that continued vegetative propagation leads to loss of vigour, but this is due to disease and not to asexual reproduction in itself or to loss of hybrid vigour, and apart from the effects of disease, we have no reason to doubt that our various asexually reproduced fruits and vegetables will retain their hybrid vigour to the end.

At Merton for the past three years we have had under investigation the utilization of hybrid vigour in Tomatos, and in some hybrid generations we have obtained not only an appreciable increase in yield of fruit above that of the better yielding parent, but a combination of this with early maturity. It is a common assumption that hybrid vigour is associated with coarseness and irregularity in such characters as fruit size and shape, but this is not necessarily so. Indeed, just as was found in Maize, some of the hybrid generations of Tomatos have been more uniform in growth and in the shape and size of fruit than the standard parental variety. Coarseness can certainly be obtained, but at Merton we are concerned in putting together in a hybrid condition those characters, or more correctly speaking, those genes or units of heredity, which give the desired results. Usually this is not achieved by inter-breeding the standard varieties, simply because they are much alike, but by breeding a standard commercial variety with forms which are entirely uncommercial. They are used in this investigation and are uncommercial just because they have the opposite characters of a commercial variety, as it usually happens that the more opposites there are brought together in a hybrid generation the greater is the expression of hybrid vigour with its accompanying economic advantages. It is a case of using the right genes in the building up of the hybrids, and in some combinations it is an advantage to leave certain genes which are found in commercial varieties out of the building altogether.

Since hybrid vigour is at a maximum in the generation immediately following a cross, the cost of producing cross-fertilized seed by artificial pollination may in some crops render its use unprofitable. In a number of horticultural crops, however, such seed is readily obtained, and in the Tomato, where from one to two hundred seeds are obtained from each pollination, the production of crossed seed is not too costly for it to be practised commercially. Indeed, the capital outlay and the cost of growing this crop is very high, and we already know that the

increased yield from our hybrid seed next year will repay the extra cost of producing it this year.

In normal times the precaution would be taken of giving the hybrid Tomatos further tests, or even of awaiting the discovery of still better hybrids, but in war-time an earlier introduction to commerce may be justified.

Fig. 90 shows plants of the Tomato Kondine Red ; Fig. 91 plants of a hybrid-vigour family in which Kondine Red was the commercial parent ; and Fig. 92 a hybrid-vigour family in which Carter's Sunrise was the commercial parent. The seeds were sown on the same day, the plants grown outside on the same plot and photographed at the same time. Note that the hybrids grow faster and carry a much heavier crop, especially on the top trusses. In all cases fruits had already been picked from the lower trusses.

GARDEN NOTES.

NOMENCLATURE OF THE PLANT KNOWN IN GARDENS AS *Phyllodoce empetriformis*.

In The New Flora and Silva of November, 1939,* Dr. STOKER pointed out that the shrub long known in British gardens as *Phyllodoce empetriformis* was not entitled to that name and, suggesting its hybrid origin, gave it at the same time the provisional name *Phyllodoce "pseudoempetriformis."*

In the most recent number of the same journal,† Mr. W. H. CAMP, of the New York Botanical Gardens, shows how the plant may fairly be deemed a hybrid and gives it the name \times *Phyllodoce intermedia* hort. clon. 'Fred Stoker,' which, in more familiar terminology, becomes \times *Phyllodoce intermedia* var. 'Fred Stoker.'

This, therefore, is the correct name of the plant which was granted an Award of Merit when exhibited by Mr. W. J. MARCHANT before Floral Committee B on April 16, 1940.

* STOKER, F., 1939, *The Genus Phyllodoce in The New Flora and Silva*, 12, 1, 39-40.

† CAMP, W. H., 1940, *Phyllodoce hybrids in The New Flora and Silva*, 12, 3, 207-211.

HOW THE PLANT BREEDER GOES TO WORK : II.

By Sir DANIEL HALL, F.R.S.

(The substance of a Lecture delivered at the International Congress of Genetics, Edinburgh, 1939.)

(Concluded from p. 288.)

THE discovery of polyploids in plants took place in the first decade of this century (ROSENBERG, LUTZ, GATES) and is becoming of prime importance both to the plant breeder and in any general consideration of the origin of species. A large number of the most important plants of the world, whether for food or ornament, are polyploids. The bread Wheats, for instance, are hexaploid, as are the commercial varieties of Oats ; the common Plum is also a hexaploid ; the cultivated Strawberries are octoploid ; and Apples and Pears present an extremely complicated case of secondary polyploidy. Even more complex is the chief commercial Banana—‘Gros Michel.’ Again, polyploidy is general in such standard denizens of our gardens as Roses, Dahlias and Irises.

It has been indicated how tetraploids may arise through the accidental doubling of a cell in the ordinary processes of growth, but perhaps more significant is the occasional formation of a polyploid cell in the sexual process. Normally, of course, a seed begins by the union of two germ cells, one from each parent. Each of the germ cells contains one only of the two sets of chromosomes in the ordinary cells of the parents, so that on their union the parental number is reproduced. But occasionally in the formation of the sexual cells, either male or female, reduction misses, thus producing a germ cell with the double complement of one parent, and this when it unites with the single complement of the other parent gives rise to a triploid with three sets of chromosomes. Such triploids are not uncommon, but in a general way they are sterile, because proper disjunction cannot take place in the reduction process which precedes the formation of the germ cells. Among the garden Tulip race, for example, normally with 24 chromosomes, a certain number of triploids with 36 chromosomes are known, all of which are chance seedlings from diploid parents and are not fertile but can be multiplied indefinitely by offsets. Similar triploids exist among the wild species, and it is interesting to note that while the parent species are usually highly variable, the individuals of the triploid species are all exactly alike, because they are all reproductions, indeed parts, of the original seedling bulb. As I have said, they are in the main sterile, because even if the triploid nucleus succeeds in dividing into viable germ cells these will possess irregular numbers of chromosomes, because you cannot divide sets of threes equally, and this

irregularity is carried on into the zygote which should form the seed. Usually this sets up such a want of balance that the new cell cannot survive, or if it does it is likely to give a weakly plant. Triploids, as might be expected, can also be produced whenever a diploid can be crossed with a tetraploid, for the diploid constitutes only one set but the tetraploid two sets of chromosomes to the new parent cell.

An exceptional case occurred at the John Innes with Rubus. Mr. CRANE crossed a wild diploid Blackberry—a mutant without thorns known as *rusticanus inermis*—with another wild species, *thyrsiger*, which is tetraploid. Crosses with var. *inermis* usually fail, but on this occasion four viable seeds were produced, three of which were sterile triploids as expected, while the fourth was a tetraploid. This must have arisen from the union of an unreduced cell of *inermis* with 14 chromosomes with the reduced cell of the tetraploid *thyrsiger*, which also contains 14 chromosomes, this half of the tetraploid number thus creating a new tetraploid of 28 chromosomes (fig. 93). It has proved to be an extremely vigorous plant with fruit of remarkable size and quality, now in commerce as 'John Innes' (fig. 94). Moreover, since it contained the genes for the thornless character, further breeding from it has given rise to a smooth and thornless race, one of which of good quality and cropping power is now in commerce under the name of 'Merton Thornless' (fig. 95). The odds against the irregular sexual union which produced the first tetraploid must have been enormous : still somebody draws a winner in the Calcutta Sweep.

A very similar "accident" gave rise to a race of Delphinium hybrids—*D. Ruysii*—of various colours from yellow to red and purple. The Dutch nurseryman, Mr. B. Ruys, had made many efforts to cross the tall blue Delphinium, *D. elatum*, with the dwarf red species, *D. nudicaule*, but had failed to obtain any seed. However, in 1929, he noticed in a batch of *nudicale* seedlings one tall plant with a dull purple flower, which proved to be fertile, and in the next generation produced plants with flowers of various shades of red and yellow. This single plant has become the starting point of the new race. *D. nudicaule* is a diploid with sixteen chromosomes and *D. elatum* a tetraploid with thirty-two, so that if crossing could be effected one would expect a sterile triploid with twenty-four chromosomes. Actually the new plants are tetraploids, so that a normal pollen grain from *elatum* must have met with an unreduced cell of *nudicaule* to form a tetraploid which permits of normal reduction in meiosis and subsequent pairing, i.e. is fertile. There is a great range of diversity in the seedlings as regards colour, height and time of flowering, the potentialities of which have not yet been fully exposed. An entirely new race, indeed a new species, has been created.

Nature, indeed, prodigal of chances and with almost unlimited time to work in, does bring off some extraordinary long shots. The domestic Plum has been mentioned as hexaploid : how can this have originated ? There are in our gardens blue Plums and yellow Plums with varying amounts of red ; some Plums again have green flesh, others yellow flesh.

Looking round the wild Plums we find the Sloe, which extends from England to the Caucasus, with the blue skin and the green flesh, and in the Eastern Mediterranean we find the Cherry Plum, with reddish skin and yellow flesh. The Sloe is generally tetraploid and the Cherry Plum diploid ; they easily hybridize and the progeny are triploid and sterile, as would be expected. But it is a reasonable hypothesis to suppose that one of these chance triploids threw a somatic double, like *Primula kewensis*, and so produced a hexaploid with restored fertility. All the variations and genetic behaviour of Plums fit with this hypothesis ; indeed, since CRANE threw out the suggestion, a Russian worker, RYBIN, has observed an occurrence of the kind, the spontaneous appearance of a hexaploid amongst a mixed population including diploid and triploid hybrids.

Our current race of Strawberries affords another interesting example of the evolution of a polyploid race. The wild Strawberry of Europe, *Fragaria vesca*, is diploid with 14 chromosomes, and though selection over many centuries has produced several improved varieties, the Alpine Strawberries and the 'Fraise du Bois,' they are still small and have not departed greatly from the wild stock. There has been found in Europe, possibly wild in Bavaria, another species—the Hautbois Strawberry, never widely grown and of the origin of which we know nothing. For centuries these were the only Strawberries grown in Europe. When old FULLER said that God doubtless could make a better berry than the Strawberry, but God never did, he had not foreseen America and the plant breeder. For with the discovery of America came the introduction, about the beginning of the seventeenth century, of an octoploid species, the Virginian Strawberry, small and red fleshed, with a marked Strawberry flavour and scent, a nearly pure strain of which is still grown for jam making under the name of 'Little Scarlet.' Still later, towards the close of the eighteenth century, another octoploid species, *F. chiloensis*, was brought to Europe from the west coast of South America. The fruit of this species is large, white fleshed, and of a dull purplish colour. We know that it was grown together with *F. virginiana* in commercial Strawberry plantations near Brest towards the end of the eighteenth century, and there it may be presumed that chance hybridization occurred, for we have no intimation of deliberate cross-breeding. It was only early in the nineteenth century that THOMAS ANDREW KNIGHT began deliberate cross-breeding between hardy fruits, and possibly he had at his disposal some of these chance hybrids from France. At any rate he did make hybrids containing the two American octoploid species and one of his Strawberries—'Elton Pine'—had a long vogue. Other raisers followed suit both in England and America and the large fruited modern Strawberry thus came into being—a cross between *F. virginiana* and *F. chiloensis*. THOMAS LAXTON introduced 'Royal Sovereign' in 1892, and it is still the leading market Strawberry in Great Britain. Recent research, beginning with A. E. LONGLEY in 1926, established the fact that only the two American octoploid species

participate in the modern Strawberry, for neither the diploid nor the hexaploid European species will yield fertile hybrids with the octoploids. Thus the plant breeder has achieved success by hybridization between two species which otherwise were geographically isolated.

At the present time the British Strawberry world is in an unhappy state. Various diseases—an insidious virus, a Tarsonemid mite, a weevil, one or perhaps two fungous diseases—have established themselves in the Strawberry plantations, and as the plants are vegetatively propagated these infections tend to accumulate and to be carried from one source to another. It is by no means easy to obtain clean stocks of 'Royal Sovereign' to-day, and even those that can be found appear to break down rapidly in the regular Strawberry districts. Old as is 'Royal Sovereign,' none of the later varieties appear to be so satisfactory, either in flavour or in constitution. Breeders seem to have concentrated too much on the size, the colour and the firmness of the fruit, purely market considerations. At a meeting of Strawberry experts the chairman once summed up the discussion by saying: "What you seem to want is a Strawberry that will bounce!" What is necessary is that the breeder shall get back to some of the wild forms to reintroduce genes which may have been dropped through breeding too exclusively for a few characters.

We can see how a similar situation in cultivated sugar canes was rectified by the work of the Dutch scientific men in Java who, by crossing the old varieties with a wild species, obtained a vigour and resistance to disease in their PJ 'Noble Canes,' which have nearly doubled the yield of cane sugar per acre.

Another example of the complex inheritance that may occur among polyploids is afforded by the Loganberry, which originated about 1880 as a chance seedling in a garden in California. It was presumed to be a hybrid between a Blackberry variety, known to be growing in the garden, and a Raspberry, but its hybrid origin was questioned because of its fertility and the fact that it breeds relatively true instead of segregating, as hybrid seedlings generally do, towards the parental types. The Loganberry is a hexaploid with 42 chromosomes, and CRANE found that its reputed Blackberry parent was an octoploid with 56 chromosomes. If, then, the normal reduced complement of 28 chromosomes of this united with an unreduced Raspberry cell with 14 chromosomes, the hexaploid with 42 chromosomes would be formed, a fertile one which would reproduce itself because the chromosomes are in pairs permitting of a normal division. Other features ascertained in breeding from the Loganberry confirm this hypothesis.

An extreme case of the long shots that nature has brought off, and incidentally of the difficulties that are thereby caused to the plant breeder, is afforded by the Apple and Pear. The normal complement of chromosomes is 34, though triploids are known with 51, but breeding experiments reveal very few characters, at least in the Apple, that are

inherited on simple mendelian lines. A red Apple crossed with a green one does not give a hybrid generation out of which in the next generation green and red Apples segregate in defined proportions, "one black and one white and two khaki," as the irreverent limerick puts it. Instead you find a sort of graded inheritance, every intermediate of colour; in fact, though parental influence can be traced in a family of Apple seedlings even in the first generation, it is only approximate as regards any of the main characters, and new characters appear that were not seen in either parent. The explanation appeared with the work of MOFFETT and DARLINGTON, who discovered that the 34 chromosomes in the Apple are made up by repetitions of the basic seven chromosomes of the great Rosa tribe, to which both *Malus* and *Pyrus* belong.

Of the basic seven chromosomes three are repeated six times and the other four are repeated four times. If, then, the gene producing a red skin belongs to one of the chromosomes repeated six times there can be individuals with one, two, three, four, or six doses of red as well as others without any red at all. Thus the gradation in colour observed in any seedling family of Apples is intelligible. In the triploids the repetition of particular genes is even greater; it is significant that several of the largest and most valued Apples, e.g. 'Bramley's Seedling' and 'Blenheim Orange' in this country, and 'Baldwin' in America, are triploids. It follows, therefore, that the breeder of Apples has little power of determining the type of Apple he will obtain; he can only cross varieties possessing the character he is aiming at, hoping that in some seedlings the genes governing the favourable character will have accumulated. But it is significant that 'Cox's Orange Pippin,' raised more than a hundred years ago, is still the most finely flavoured Apple, superior to any of the thousands of seedlings that have been raised from it. Mr. CRANE has raised from good varieties more than four thousand seedlings to the fruiting stage, and not more than 1 per cent. have been considered worthy of propagation even for the purpose of further tests under more normal conditions, let alone for introduction commercially. Still the pursuit of improvement is not hopeless, as may be seen from the work on resistance to woolly aphis, initiated by Mr. CRANE, and carried on in co-operation with the East Malling Research Station. Woolly aphis is an insect pest of the Apple, troublesome in this country, but much severer in its attacks in warmer climates. The difficulty of dealing with it comes from the fact that besides infecting the shoots it also establishes itself upon the roots. The aerial attack can be controlled by various methods, by means of a parasite or by spraying, but in the following season the trees become reinfected from the roots. If, however, a stock immune to the attacks of woolly aphis can be found, the reinfestation would be prevented. One variety of Apple exists—'Northern Spy'—which is for practical purposes immune to woolly aphis and thus can be used as a stock, indeed by legislation in Australia and New Zealand, 'Northern Spy' must be the only stock employed. However,

'Northern Spy' is in many respects a bad stock, and again the Apple grower requires a variety of stocks, some dwarfing, some producing big and long-lived trees. CRANE began to make crosses between 'Northern Spy' and some of the old stocks standardized at East Malling ; the seedlings were then tested at East Malling for their immunity to woolly aphid and their character as stocks. Immunity is inherited, sometimes completely, sometimes partially or not at all, but so far the outcome of the work has been the selection of two stocks that propagate readily and are immune to woolly aphid, and these are now being distributed.

But though one can give a number of examples of the kind of problem the plant breeder meets with the question will be asked—How far does the science of genetics help him ; is he any better off than his predecessors of fifty or a hundred years ago, who did give us so many remarkable cultivated plants ?

The plant breeder still has to wait for the occurrence of mutations, and though the rate of incidence of mutations can be increased by devices like bombardment of the seed or the plant with X-rays, few if any practical successes have attended the use of these methods, though without doubt they will prove of value. For we have to remember that even if we get a mutation the odds against its being one of economic value are heavy. However, if the mutation is observed the breeder is now provided with a technique for "fixing" it and combining it with other characters of the plant, a procedure that is relatively exact and quick, instead of the old, tedious and never final process of rogueing generation after generation. Science, again, can inform the breeder where some character observed in a hybrid can or cannot be fixed, because it may be associated only with the hybrid condition. Indeed there is one hybrid character of great economic importance, the hybrid vigour that is characteristic of first crosses between two varieties. Pure lines self-fertilized are often relatively sterile and lacking in vigour ; a first cross between two such pure lines may be far superior in yield to either parent. It is essential that the two parents should differ somewhat but not too widely, for in that case the first crosses may lack uniformity. So considerable is the advantage to be derived from hybrid seed that it is now produced commercially for both maize and sugar beet, and is likely to become standard practice with Tomatos. Of course, the first cross seed must be remade from the original parents every year ; seed saved indiscriminately from first cross plants is likely to be mongrelized.

When something is known of the genetics of the plant under experiment it may be possible to calculate the odds against the appearance of a desired combination. For example, there appeared about six years ago, a very striking orange mutant of *Primula sinensis*, which received the name 'Dazzler.' Advice was asked as to how many F₂ seedlings must be raised of the cross 'Dazzler' × double 'Duchess' (a white variety with pink eye) to produce a double 'Dazzler.' On genetical grounds a ratio of 1000 : 1 was estimated. Actually the



FIG. 80.- QUEEN HATSHOPSTU, ORIGINATOR OF THE FIRST RECORDED PLANT
HUNTING EXPEDITION
(See p. 334)

[To face p. 332.



FIG. 90.—TOMATO KONDINE RED



FIG. 91.—TOMATO HYBRID WITH KONDINE RED



FIG. 92.—TOMATO HYBRID WITH CARTER'S SUNRISE.

RUBUS RUSTICANUS

R THYRSICER

TYPE var
INERMIS

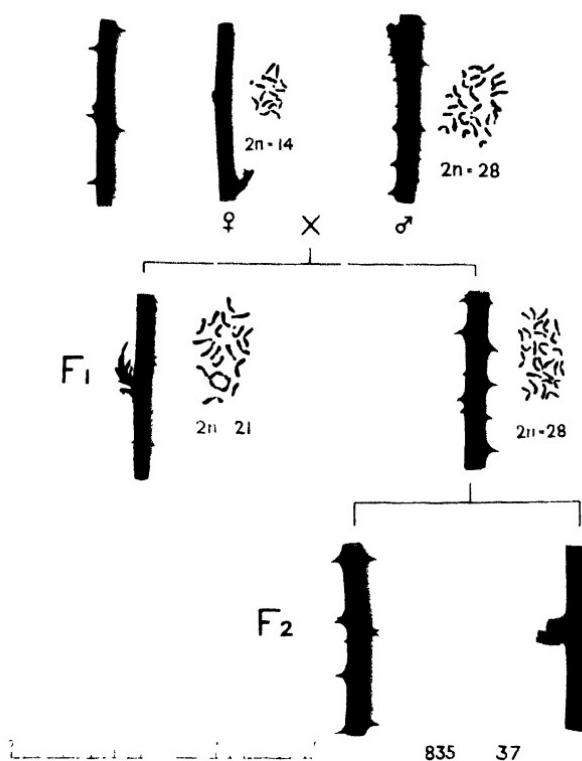


FIG. 93.—SHOWING THE ORIGIN OF MERTON THORNLASS BLACKBERRY.



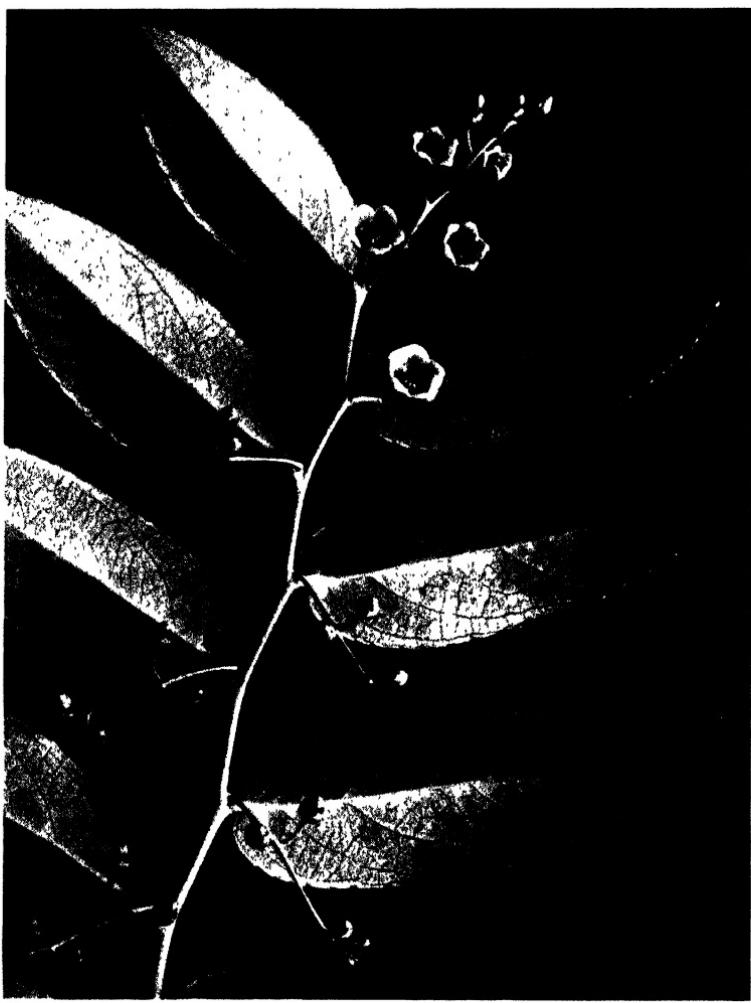
FIG. 94.—LEFT—THE TRIPLOID F₁ SEEDLING IN FIG. 93 RIGHT—THE TETRAPLOID F₂ SEEDLING (*RUBUS 'JOHN INNES'*) IN FIG. 93.
(See p. 328.)



FIG. 95.--MERTON THORNLESS BLACKBERRY
(See p. 328.)



Photo, R. M. Liam
FIG. 6 - GAULTHIERIA YUNNANENSIS IN ROCK FACE, EDINBURGH BOTANIC GARDEN
(See p. 319.)



Photo, R. M. Adam]

FIG. 97 - *Gaultheria yunnanensis*
(See p. 310)



FIG 98 - THE BOTANIC GARDENS, GLASNEVIN, IN 1800.
(See p 349)



FIG. 90.—*CHRYSANTHEMUM DEMINUTUM*
(See p. 353.)

[To face p. 333.]

grower raised 800 plants and obtained one of the required type, a very fair agreement with the estimate.

Sometimes the value of science lies in turning the breeder off unprofitable lines. He should not use triploids or pentaploids as parents ; even if he gets any viable seedlings they are likely to be weakly things. When such and such a new Apple is advertised as a seedling from 'Bramley's Seedling,' which is a triploid, one becomes sceptical ; one has heard of adventurers that liked to give out that they were royal by-blows. All the same, when one is dealing with plants in which polyploidy exists, breeding from a triploid so as to get an irregular chromosome outfit may be a very long shot, but it may be the only chance of getting something entirely novel.

Science may warn the breeder that a given plant may not be all that it looks, it may be a chimera—a sort of wolf in sheep's clothing. For the germ cells lie underneath the skin, inheritance may be from the inner wolf, not from the outer sheepskin. Hence otherwise inexplicable results in breeding Potatos, many varieties of which are chimeras.

It has been already indicated how many advances are opened by our knowledge of polyploidy and the possibility of inducing it ; instances also which show the advantage on occasion of resort to some of the wild types of a cultivated plant, because of the degeneration that may set in through breeding too long or too exclusively for particular characters.

It is when we come to plants that possess a long history of domestication behind them, plants that may have a multiple hybrid ancestry, and are already the products of many generations of trial and error, that scientific control becomes of little effect. Such are ornamental plants like the Rose or Iris or Tulip, food plants like Wheat or Cabbage. Years of investigation may be needed before the plant can be analysed for all its valuable characters, and analysis must precede synthesis for a desired result. The plant breeder can attack them piecemeal as regards a particular character, but for general improvement he is back on the old procedure of breeding from the best sorts available that offer a chance for a happy combination, and selecting the offspring drastically. The odds against him are great because the plant has already travelled far along the lines of possible improvement—there are always limits, physical or physiological, to what the plant can be made to do. So success will lie with big battalions ; in the search for grape vines immune to phylloxera and mildew, but possessing the qualities that yield 'Schloss Johannisberg' or 'Chateau Lafite,' the Institute at Müncheberg is reported to be raising half a million seedlings a year and to have five to ten millions under examination.

Chance is still dominant, and the plant breeder must arm himself with as much of the infinite patience of Nature as he can command. Sometimes the would-be plant breeder asks me if it will do him any good to learn the science of his calling ; he need not be afraid, at least it won't hurt.

THE FIRST RECORD OF PLANT INTRODUCTION.

By R. E. COOPER, F.R.S.G.S.

ABOUT five hundred miles south of Cairo, on the river Nile, is a small village with the Arabic name of El-Uksur, which means "the palaces" and refers to the abundant remains in the neighbourhood of temples and tombs of one of the most ancient of the Egyptian cities. The village is the modern Luxor, while the ancient city was called in hieroglyphics *Uast*. Its name was written in the cuneiform inscriptions and the Hebrew scriptures as "No," *i.e.* "Nut," the city (Ezek. xxx. 14), and "No-Amon," *i.e.* "the city of Amon" (Nahum iii. 8). It is more generally known as Thebes.*

Among the most noteworthy of the ancient temples so far discovered is one on the western bank of the river at Deir el Bahari: that of the daughter of Thoutmosis I, Queen Hatshopsitu. Now, the ancient Egyptians favoured a vegetable gum called *ani* which gave off an attractive odour when heated. They used it extensively, burning it before their gods, offering it as the choicest gift to the dead, and using it as a drug, as a preservative and as a cosmetic. It was obtained from a neighbouring land called Punt, famed for other pleasant perfumes as well, since the phrase "the scents of Punt" meant all that is most delicious to inhale.

Punt seems to have played an important part in ancient Egyptian traditions. It was the region called by the ancients the "Troglodytica," "the land of aromatics," "Myrrhifera regio Thurifera," "Cinnamomifera." There was also in Arabia Felix a "Thurifera" region, which then, as now, produced incense. Punt stretched along both sea coasts, but it is certain that the Egyptians in all their expeditions landed on the African coast. The chief thing one went to seek in Punt was a gum called *ani* or *anti*, produced by a bush called *Boswellia thurifera* or *Boswellia Carteri*. Large quantities of it were imported, and it was considered so necessary that the rulers of Egypt did not hesitate to make naval expeditions in order to get their supplies of it. The first of which we have some details, taken from inscriptions on temple walls, dates from the XIth dynasty.

An opportunity to see these personally was spoilt by the outbreak of the riots in Egypt at the end of the Great War, but among the literature on this subject "Excavations," by THEODORE M. DAVIS,† has been the greatest source of information. In the eighth year of Sankhkara (*circa* 2500 B.C.),‡ the last king of the dynasty, an officer named Honnu received an order from his sovereign to equip vessels of transport to go to Punt and bring back the fresh incense supplied to

* COOK, T. Handbook for Egypt, 1911.

† DAVIS, T. M. Excavations. London, 1906.

‡ The pyramids of Giza were built *circa* 3700 B.C.

him by the chiefs of the Red Land (the desert). Details are given of his various difficulties. He left Coptos with 3,000 men for the port which is now Kosseir, and had difficulty in procuring water for all his troops, as he had even to dig wells. On arriving at the sea coast he had to build ships. He remained absolutely silent, however, about the spot where he landed and about all that occurred during his expedition, merely stating that when he got back to his starting point he had accomplished the king's order and brought safely back the products of the "divine land." This narrative gives no information about the land of Punt at this epoch.

Doubtless this practice was employed in the years before and for some time afterwards, but the next important record is not until about a thousand years later. The reign of Queen Hatshopsitu of the XVIIIth dynasty (*circa* 1600 B.C.) is considered particularly remarkable for an expedition to Punt, not only to get the gum *ani*, but also for the purpose of introducing into Egypt the plants from which it was gathered. The story appears on the walls of the southern shrine of her temple, and thus provides the earliest recorded instance of plant introduction. We do not know the exact date of this expedition. It is already spoken of in the inscription of the year 9, where incense trees planted in the garden of Amon and the embellishment of this garden, owing to "Punt being transported to Thebes," are mentioned. It must, then, have taken place at latest in the year 8, perhaps a little earlier. It was not a simple fancy of the queen's to send the expedition, for she tells us, in the inscriptions made by her command, that it was by the express order of the god Amon that she made it. To lead her ships to the land of Punt, Queen Hatshopsitu chose a chief who appears before her with other high officials at a ceremony in the year 9. He is called Nehasi, "the Negro," a prince, chancellor, first friend, wearing "the collar," and therefore belonged to one of the highest ranks of the administrative hierarchy.

Nehasi did not take with him a large fleet: he contented himself with five ships, and made his way to the African coast of the land of Punt. He is depicted on arrival landing on the shore followed by nine soldiers, the first of whom seems to be an officer with a lance, a battle-axe and a bow; the other soldiers have only lances and shields. Nehasi himself, as his mission is quite peaceful, is unarmed, and only bears a long staff, on which he leans. On a small table he has placed the presents offered by the queen. These are not of great value, being necklaces, probably made of blue porcelain beads, an axe, a dagger in its sheath, and a few bracelets: trinkets like those used at the present day in dealing with the negroes of Central Africa. On the shore are the huts of the people, built up on poles in order to protect the inmates against wild animals, with ladders giving access to them. These huts, very similar to those described by modern travellers in Central Africa, are made of wickerwork, probably of palm stalks. Although the inhabitants belong to totally different races, the huts are all of the same shape and construction and stand

under the shade of date palms and of other conventionally formed trees which, judging from the inscriptions, may represent Frankincense and Ebony trees. Near the huts they are certainly Ebony trees, the branches of which are cut down by the Egyptians in great quantities, and which are high enough for the cattle to rest beneath in the shade.

As the fauna of Punt is shown to consist entirely of African animals, it cannot be doubted therefore that the fauna is that of an African country. The Punites are representatives of that red race to which the Egyptians also belong, the Hamitic race, which gave its name to the Erythraean Sea. They are painted red, but with the red of Horus, which is not exactly like that of the ancient Egyptians. Nehasi, the ambassador of Hatshopsitu, appears in the middle of this mixed population and sets up his little table with the things destined to be exchanged. The chief of Punt, Parohu, approaches followed by Ati his wife, his two sons and his daughter, raising his arm in salute or in supplication to the stranger, but the meeting soon becomes very cordial. In front of a tent pitched on the sea shore by order of the ambassador, Parohu brings his goods or tributes to be exchanged against the products of Egypt ; they consist of gold in rings, a heap of boomerangs, like the weapon which Parohu has in his hand, and a big heap of frankincense.

When the trading is finished, and as his queen has ordered him to be generous and to show something of her royal hospitality, Nehasi entertains the chiefs of Punt to a banquet in his tent. We learn from the inscription : "The preparing of the tent for the royal ambassador and his soldiers in the harbours of frankincense of Punt, on the shore of the sea, in order to receive the chiefs of this land, and to present them with bread, beer, wine, meat, fruits and all the good things of the land of Egypt, as has been ordered by the sovereign." Meanwhile, both Egyptians and Punites are actively engaged in loading the ships with cargo, the objects of particular care being Frankincense trees in pots or perhaps in strong baskets. The loading is described as follows : "the loading of the cargo-boats with great quantities of products (*lit. marvels*) of the land of Punt, with all the good woods of 'the divine land,' heaps of pieces of '*ani*,' and trees of green '*ani*,' with pure ivory, with green (pure) gold of the land of Amu, with cinnamon wood, *Khesit* wood, with balsam, resin, antimony, with cynocephali, monkeys, greyhounds, with skins of panthers of the South, with inhabitants of the country and their children. Never were brought such things to any king, since the world began." A great portion of the wall of the middle terrace of the temple of Deir el Bahari is devoted to the representation of all that came from Punt. In the way of animals there are the giraffe, two species of oxen—the "sanga" with short horns, still seen in the land of the Somalis, and the ox with long and twisted horns, now found chiefly near the Zambesi River and in the Transvaal—also two kinds of panthers or leopard, one called the "southern," which seems to be the common panther, and the other

kind, of which there are two held by collars, probably more or less tame, which may be the hunting leopard, the cheetah. It is doubtful whether all these animals came with the expedition from Punt, when it is stated, for instance, that the number of long-horned bulls is said to be 3,300 ; one may perhaps imagine that they came with caravans, after commercial intercourse had been established between Egypt and the regions of the Upper Nile. But the other products must have come from Punt, the leopard skins in great numbers, ostrich eggs and feathers, precious woods like ebony, boomerangs, ivory or rhinoceros horn, antimony (*mestem*) destined for painting the eyes, and especially incense and precious metals.

Upon their safe arrival the incense was emptied out of the sacks, piled in great heaps, and offered up to the god Amon ; the comptroller god Thoth presides at the operation and is supposed to keep the accounts—a superhuman task, as the number of measures amounted to millions and hundreds of thousands. Beside the heaps of incense stand the incense trees in their pots. They were planted later in the garden of Amon, where they flourished so wonderfully that the cattle could walk under them.

The queen herself, with her own hands, put oil of *ani* on all her limbs. Her fragrance was like a divine breath, her scent reached as far as the land of Punt ; her skin was as of gold and shone like the stars in the hall of festival, in view of the whole land. Queen Hatshopsitu attached great importance to this expedition to Punt, because she gloried in it. It also seems to show us quite clearly how commercial relations were established between Egypt and her neighbours.

PLANTS TO WHICH AWARDS HAVE BEEN MADE IN 1940.

Chrysanthemum 'Honeydew.' A.M. August 27, 1940, as an exhibition variety. Raised and shown by Messrs. J. & T. Johnson, Tibshelf, Derbyshire. An early-flowering variety, with robust, stiff flower stems, clothed with evenly spaced, dark green foliage of medium size. Flowers $4\frac{1}{2}$ -5 inches across, ball shaped, incurved ; petals stiff, incurved, yellow toned amber ; outer florets with a faint rose tinge.

Chrysanthemum 'Sweetheart.' A.M. August 27, 1940, as an exhibition variety. Raised and shown by Messrs. J. & T. Johnson, Tibshelf, Derbyshire. An early-flowering variety, with stiff, stout stems ; foliage of medium size, dark green. Flowers $4\frac{1}{2}$ -5 inches diameter, flattish ; petals stiff, rose-pink, reverse of central petals tinged bronze.

WHY "JERUSALEM" ARTICHOKE?

By REDCLIFFE N. SALAMAN, F.R.S.

It is an outstanding paradox of history that although the acquisition of gold was both the driving force and the immediate outcome of the discovery of the New World, this new and abundant source of wealth had very little if any beneficial effect on the economy of the countries directly affected. Spain, indeed, who had appropriated vast quantities of gold and silver, was bankrupt within 100 years of COLUMBUS' venture in 1492. The new sources of real wealth which the Americas gave to the Old World were at first passed over in silence, to be recognised some 200 years later.

These new sources of real wealth were certain vegetable foods hitherto unknown, principal amongst which were Maize, the common Potato, the Sweet Potato and the Jerusalem Artichoke. Of the two latter the Sweet Potato was the first to be recognised and introduced into Europe where it flourished in the south; the Potato came later, but as it accommodated itself to a wider range of climate it soon began to exert a profound and ever growing influence on world economic and social development. Indeed it has been calculated that the value of the world crop of Potatos in any single year is considerably greater than all the gold and silver which was wrested from Peru, its native land, during the period of conquest. The last arrival was the Jerusalem Artichoke, and though its value as food both for man and animal in temperate climates is not much less than that of the Potato, it has so far failed to win the approval of the masses of the people in any country.

Each of these roots acquired a variety of names any one of which was frequently used indiscriminately for any other of the trio, a fact which makes the study of their early history and the names by which they came to be known in various lands a matter of considerable difficulty.

In this essay I wish to limit myself to the attempt to explain the origin and the *raison d'être* of the peculiar names which have attached themselves in different European lands to the root which we commonly call the Jerusalem Artichoke.

It will perhaps be best if we clear the ground by defining the plant by its technical Linnaean name, *Helianthus tuberosus*. The plant is in fact a tuberous and perennial form of *Helianthus*, the form of *Helianthus* which is best known to gardeners being *Helianthus annuus*, the common Sunflower. As I shall have frequent occasion to mention both these plants, which in the course of their 300 years sojourn in Europe have acquired a bewildering number of aliases, I will refer to them as *H. annuus* and *H. tuberosus* respectively.

Our immediate task therefore is to discuss the origin and reason for

some of the peculiar names which *H. tuberosus* has acquired in Europe. These may be set out as follows :—

- (1) Artichoke : Artichaut (French); Erdartischocke (German).
- (2) Topinambour : the name in common use in France, Germany (as Topinambur) and frequently in Italy.
- (3) Tartufo bianco : a common name in Italy.
- (4) 'Jerusalem' Artichoke : the only name used in England.
- (5) Girasole del Canada : the name applied to it occasionally in Italy.
- (6) Erd-apfel (German) and Pomme de terre (French).

We shall examine some of these terms in detail but will deal with the last first in order to avoid confusion. *Erd-apfel* was a Flemish name for *H. tuberosus* which the root carried with it into Germany and the name persisted till 1718 ; thence it returned as *Pomme de terre* to Burgundy and remained as a term for *H. tuberosus* in northern France and Lorraine till well into the 18th century. Later *Pomme de terre* became the substitute name for *Solanum tuberosum*, but Sir DAVID PRAIN tells us (Transaction of S.E. Union of Scientific Societies 1923, p. 38) that in some parts of Alsace the Jerusalem Artichoke is still an 'earth apple' and the Potato a 'ground berry.'

Artichoke : the true Artichoke is, of course, the Globe Artichoke (*Cynara Scolymus*), which is not only botanically entirely distinct from *H. tuberosus* but is a native of the Old World and has been cultivated in Mediterranean countries for possibly two thousand years. Its name is derived from the Arabic *Al-harshuf* which, according to HOBSON JOBSON (1903), means "rough-skinned" ; this, by transition through Spanish-Arabic and old Spanish, passed to Italy as *Ariciocco*, which in modern Italian is *Articiocco*, from which we derive the form Artichoke.

As the cooked *H. tuberosus* is both in taste and texture reminiscent of the 'fond' or base of the Globe Artichoke, the name Artichoke either alone or combined with some other generally misleading qualification was freely given it. In defence of the term is the fact that the first European to record this new plant himself compared it to the Artichoke.

The next name for *H. tuberosus*, that of Topinambour, has a quite different origin, and before we can adequately track that down it will be necessary to determine the land of origin and the date of the introduction of the root.

H. tuberosus and its congener *H. annuus*, the Sunflower, are natives of North America. The former, according to most authors, including BRITTON and BROWN (1913), ranges from Nova Scotia in the east to Minnesota in the west, and to Kansas in the south. Recently (1930) the Russian ecologist, BUKASOV, has come to the same conclusion as American authorities such as Prof. ASA GRAY had previously done, that the centre of origin and distribution of this plant is in North America. From these facts two important deductions emerge : one that it could not have reached Europe before the 16th century, the

other that notwithstanding a variety of statements by early writers neither Mexico, Brazil nor Peru was its homeland.

The New World gave us, as we all know, many of our most useful plants, but their true value was never realised at the moment of their introduction nor, indeed, for long after ; hence the tantalizing fact that we can rarely be sure either of the time of its translation or of the name of the individual responsible for it. It was perhaps characteristic of the sixteenth century, when a raving lust for gold competing with an equally fierce passion for religious dissidence inspired the action of both individual and state, that such matters as these should receive but scant attention. As an example of this attitude the tale of the Potato's progress in Europe is an object lesson which, however, we have not space to enter into on this occasion.

With regard to *H. tuberosus* we are rather better off. Let us first establish certain fixed points. *H. tuberosus* is not mentioned in GERARD's Herbal of 1597, nor in any other botanical work of the sixteenth century. It is first recorded in English by VENNER in the 1622 edition of his *Via recta ad Vitam longam*, but not in the 1620 edition ; it was known to continental writers at slightly earlier dates. Hence our search is confined to a period covering the first decades of the seventeenth century.

Actually the first European to record the existence of the plant is SAMUEL CHAMPLAIN himself, in his account of his second and third journeys to New France. It is to be found in the edition of H. P. BIGGAR, 1922, Vol. I, p. 135. While surveying the coast of the Armouchiquois he arrived at a certain place which he describes as a very beautiful spot, which they named Mallebarre. To-day this is known as Nausett Harbour ; it lies on the Atlantic coast of the Cape Cod Peninsula, Massachusetts, 41° 51' N. On the 21st of the month, July 1605, the Seigneur DE MONTS, the leader of the Expedition, determined to visit the homes of the natives. They passed through fields of Indian Corn and "saw an abundance of Brazilian Beans, many edible Squashes of various sizes, Tobacco and roots which they cultivate, the latter having the taste of Artichokes" (translation). There can be little doubt that this was no other than our *H. tuberosus*.

CHAMPLAIN made his first visit to Canada in 1603 and in the following year published a book entitled *Des Sauvages : ou voyage de Samuel Champlain de Brouage fait en la France Nouvelle 1603*. On June 23, 1603, he described the plants growing in the neighbourhood of St Croix about 30 miles up river from Quebec : "In these parts are found quantities of Grapes, Pears, Hazel Nuts, Cherries, red and green Currants and certain small roots the size of a small nut, tasting like Truffles which are very good if roasted or boiled." BIGGAR identifies the Pear as *Amelanchier canadense* or swamp sugar and the roots as the Ground Nut (*Apios tuberosa americana*). DENYS, writing about the year 1670, mentions the occurrence of these roots in Acadia and says that the natives were particularly fond of them. It is these same roots which HARIOT had described as growing in Virginia and of which he

seems to have given a specimen to GERARD who promptly confused them with the common Potato. It is from this error that the name Potatos of Virginia was applied to our common Potato and led to the assumption that they originated there where, in fact, they were unknown. It was but a few years later that a rather similar mistake gave rise to the myth that *H. tuberosus* came from Brazil.

In 1606 the Seigneur de POUTRINCOURT, the successor of MONTS, persuaded MARC LESCARBOT, a lawyer, to accompany him to Port Royal in New France, which had been recently (1605) founded by MONTS and CHAMPLAIN. Port Royal is known to-day as Annapolis, a harbour within the Bay of Fundy on the west coast of Nova Scotia. POUTRINCOURT'S party arrived on July 27, 1606, and returned with CHAMPLAIN in their company, arriving at Roscou in Brittany on September 28, 1607. LESCARBOT wrote an account of the New Colonies in a book entitled *Histoire de la Nouvelle France*, published in 1609: on page 849 of this book he writes "There is, moreover, in the territories of the Armouchiquois a certain kind of root as big as one's fist, very good to eat, having a taste which recalls the Cardoon [*Cynara Cardunculus*, a thistle-like plant closely allied to the Globe Artichoke] but more agreeable. These plants multiply in an amazing manner" (Translation). This is the first published account of the root. It is not, however, the earliest notice of its existence by a European, for CHAMPLAIN, as we have seen, observed them in 1605. LESCARBOT, then, gives it as his opinion that this plant is PLINY'S 'Afrodille,' a suggestion which, as LACAITA has pointed out, is doubly unfortunate. There is no such plant as an Afrodillus or Aphrodillus described by PLINY, nor is there the remotest likeness between *H. tuberosus* and PLINY'S Asphodelus, a Lily to which he presumably was referring.

LESCARBOT, who was in charge of the garden at Port Royal in Nova Scotia, had almost certainly seen this plant growing in the Governor's garden where it had probably been planted directly after CHAMPLAIN had encountered it, for, as we shall see, he had a full knowledge of its character as a food and a high opinion of its worth.

There matters rested till LESCARBOT brought out a third edition of his book in 1617. Dilating on Providence's obvious bias towards the French, he states on page 660: "When it was essential to find the wherewithal to live, God caused us to find roots, which to-day one can find served as a luxury on many a table in France, which some people in Paris ignorantly call Topinamboux whilst others, more correctly, 'Canada,' for it is from there that they came here." (Translation). Further on he repeats his original observations as to their likeness to the Cardoon, and on page 931 he continues: "We brought some of these roots to France, and these have multiplied enormously so that every garden is now furnished with some. One eats them either according to PLINY'S recipe or boiled in water or with butter and a touch of vinegar. But a plague on those who caused the hawkers in Paris to call them Topinamboux."

We may at this point with advantage set forth the plain facts as

so far ascertained. They are : *H. tuberosus* was first observed by a European as a cultivated plant in Massachusetts in 1605, and that man was CHAMPLAIN. The first published mention of it occurs in 1609. Between 1609 and 1617 the root had been introduced into France, had become popular and acquired the peculiar name Topinambour.

Our problem now narrows itself down into finding if possible the actual date of its introduction and the origin of the name it had so unexpectedly acquired. As regards the first, LESCARBOT definitely says : " Nous avons apporté quelques unes de ces racines en France." and there is no need to doubt his word. LESCARBOT was only once in New France and returned thence, as we have seen, in September 1607. He says 'we' and not 'I,' hence the suggestion made by W. F. GANONG, the editor of the Champlain's Society's publication and quoted in the excellent article on the Jerusalem Artichoke by C. C. LACAITA in the Kew Bulletin 1919 which I have found an invaluable guide. GANONG suggests that the man who really brought the tubers over was a member of the party called LOUIS HÉBERT, who had been put in charge of a nursery garden not far from Mallebarre by the Seigneur DE MONTS. LESCARBOT tells us that HÉBERT was an apothecary and that besides his knowledge and experience of his own art, he took great pleasure in cultivating the soil. To one of these two men then may very possibly belong the credit of having introduced *H. tuberosus* to France in 1607.

The problem, however, may not be so simple as would appear. Sir DAVID PRAIN has pointed out to me " Nous avons apporté " might just as well convey the meaning " We Frenchmen have," as one more personal. If this be so, we must consider whether there are not others who might possibly have brought or sent the roots back to France ; of all such persons the most likely is the Jesuit, Father BIARD. The Jesuits had long clamoured for admission to Acadia but HENRY IV evidently felt that Acadia, unlike Paris, was not worth a mass, and permission was refused. After HENRY's assassination by RAVAILLAC, the Queen Mother rescinded the prohibition and Father BIARD reached Port Royal at Whitsuntide 1611. He immediately evinced his interest in the food plants of the colony and is credited with sending tubers straightway back to France. In 1616 BIARD published his *Relation de la Nouvelle France* in which he describes one of the roots common as articles of the native dietary. This is *Apios americana*, the Ground Nut, which he says grows wild in the shade of the oak trees and is known to the natives by the name of Chiquebi.

LESCARBOT, in the 1617 edition of his work, writes the words " Nous avons apporté " for the first time and then proceeds to apply to the *Helianthus tuberosus* the identical words employed by BIARD for the *Apios americana* and by so doing incorrectly describes its habits and its native name.

This coincidence is not without importance ; it might be interpreted as implying that in reality it was BIARD who introduced the root and that LESCARBOT, reading his book prior to the publication of the third edition of his own, recalled with regret the fact that the

plant which he had been the first to describe and which had since become so popular at home, had been introduced by another. Personally I think that this would be an over-statement, for the following reason : in 1616 COLIN published a French translation of Monardes' classic on the medicinal herbs of South America, and to this he adds a note on *Helianthus tuberosus*, in which he says :—

" Depuis quelques années en ça nous avons recouvert une plante qui, à bon droit, doit être mise au rang des herbes du Soleil ; le vulgaire l'appelle Truffe du Canada ; on dit qu'elle a été apportée de là. . . . Cette plante provigne de telle sorte qu'on s'en sert au lieu de glands et châtaignes, pour engraisser le bétail et les pourceaux. Nous l'appellerons doncques *Herba solis tuberosa radice, et flore prolifera.*"

It is to be observed that he says " Nous avons . . ." clearly meaning, " We French have . . .," and then proceeds to say that it is used for the fattening of cattle and pigs. Now for the new root to have attained by 1615 an acreage of cultivation adequate for the general feeding of stock, implies that it must have been grown over a considerable number of years. Had BIARD introduced the tubers, its first season in France would have been 1612, which would have allowed but 3 to 4 years, too short a time for such an extensive cultivation. On the other hand, had LESCARBOT introduced them in 1607-8, there would have elapsed at least eight years in which to reach the stage indicated by COLIN.

I would therefore suggest that LESCARBOT or his immediate companions introduced the plant in 1607, but that he did not recognise the importance of the matter till several years later when it had acquired the name Topinambour which he rightly regarded as fantastic, and BIARD and others were busy acclaiming its merits.

The name Topinambour, given to the new root by the street hawkers, is not difficult to explain.

CLAUDE DELAUNAY, Seigneur of RAZILLY, a well-known sailor, visited Brazil in the early years of the seventeenth century and returned to Paris in April 1613. His travels had taken him to Maragnan, an island now known as the Isle de S. Luiz de Maranhão, lying in the delta of the Guajahu, 2° 50' S. and 45° W. This island was inhabited by a tribe of the warlike race of Guarani known as the Topinambous. RAZILLY on his return brought with him a party of six natives and introduced them on April 15 of the same year to the Queen, MARY DE' MEDICI, the widow of HENRI IV and the mother of our CHARLES I's Queen, HENRIETTA MARIA. MARY at that time was Regent for her son LOUIS XIII. Although RAZILLY's motives may have been influenced by the desire to court notoriety, they may equally well have had a political background. The French at that time were vigorously attempting to establish themselves on the coast of Brazil and evict the Portuguese : to that end they had made much of their intention to establish a régime free from religious prejudice. JEAN DE LÉRY in his *Histoire d'un Voyage fait en la Terre*

du Brésil, 1578, goes so far as to claim that "the Toupinambaouts were allies and confederates of our nation"—a fact which JOAN BOEMUS omits in his English translation of LÉRY's work published in 1590. In any case their appearance in Paris created considerable excitement. Of this we have contemporary evidence in the letters of FRANÇOIS DE MALHERBE to the great naturalist, NICHOLAS DE PIERESC, written on April 15 and June 23 of 1613 respectively, of which the following are translations :—

" To-day [April 15] the Seigneur of Razilly, who in the last few days has returned from the Isle of Maragnan, has shown the Queen six Topinambours whom he has brought from that country. In going through Rouen he dressed them in French style, for according to the custom of their country they go quite naked except for some black rags with which they cover their private parts. The women wear nothing. They dance a kind of swing without holding hands or moving from the place. Their fiddles were a gourd like those which the pilgrims use for drinking, and inside they have some kind of nail or pin. One of them had one and their interpreter, who is a Normandy man from Dieppe, had the other. I believe that this piece of plunder will not create great envy among those who have not been there. The language should be fairly easy, for M. de Razilly, who has been there only six months, makes himself understood to them, and one of the monks with him appears to talk even better than he does. They say that when our people arrived on the island, they were forcibly presented, even the good Father Capucins, with young women for their pleasure, should they so wish, but they entirely rejected their caresses."

On June 23, MALHERBE writes again :—

" The Topinamboux will be baptised tomorrow : if there is a chance of seeing it without being crushed, I shall do so ; if not, I shall get those who were there to report to me. Already a couple of wives have been found for them ; I understand they are only waiting for their baptism, to celebrate the marriage and ally France to the Island of Maranan."

To this LALANNE, the Editor of the 1862 edition of MALHERBE's works, adds the following notes :—

" Three were already dead. The three survivors received baptism with great pomp in the church of the Capucins. The Father Claude d'Abbéville, of whom we spoke above, served as interpreter. The King was their godparent and they were named Louis-Marie, Louis-Henri, and Louis-Jean," and, adds LALANNE " Prints representing the Topinambours are to be found in the Bibliothèque Impériale Portfolio of French History." It is apparent that these poor naked savages had " caught on " and had become the " talk " of the town. Indeed their popularity was no passing phase for their name was not only on every tongue but even fifty years later we find BOILEAU writing a

scathing lampoon on NICHOLAS DESPREAUX in which occur these lines :—

“ En l'Académie entre nous
souffrant chez soi de si grand fous
me semble un peu Topinamboue.”

The word Topinambou, meaning something gross and absurd, makes the sequel to the tale but the more probable. It was just at this time, when RAZILLY's natives were the “rage” in Paris, that the street-hawkers of that city were trying to sell the strange and rather uncouth-looking new roots which had so recently been introduced from the New World. What better catch-word for it, then, than Topinambours, of whom everybody was talking? The poor Topinambours had their short day of glory and passed away, forgotten, but an echo of their strange visit, linked to a more enduring wonder, a new vegetable, has reverberated throughout the ages. That there was not the remotest relation between them did not appear to matter; more than that, for the next two hundred and fifty years encyclo-pædias and dictionaries and not a few books of scientific pretensions continued to ascribe the origin of the root to Brazil on no firmer basis than its name of Topinambour.

A modern parallel to the transference of a name to quite unrelated objects under circumstances of popular emotion will occur to some of the older of my readers. I refer to the year 1882 when Jumbo, a particularly big and popular elephant in the London Zoo, was sold to BARNUM, the American showman. Public feeling was aroused and was increasingly opposed to the transaction and Jumbo became a hero. In a very short time he represented the solidity and strength of the country's genius. When he refused for a long time to enter his travelling wagon, it was but evidence of his love of country, and his sentimental devotion for his companion, another elephant called Alice. The word “Jumbo” came to mean anything big—especially stout men and women; it passed from slang into accepted English. It became a trade name for new colours in fabrics, including a specially broad straw-plaiting. Habitues spoke of the famous Elephant and Castle public-house as Jumbo. The craze spread even to the fishing-banks of Newfoundland where the big forestay sail of the trawlers became known as Jumbos. Even writers of eminence succumbed; “She's a Jumbo at theory, but weak in practice,” write KIPLING and BALASTIER in Naulakka: As with Jumbo, so it was 300 years ago with the pathetic visitors from a far distant land. Jumbo was killed by a railway engine; the latter appear to have rapidly succumbed to disease, victims both to an incongruous environment.

We must now trace the further progress of the root. In Italy the earliest botanical description of *H. tuberosus* is given by FABIO COLONNA. LACAITA points out that COLONNA does not mention it in his *Phytobasanos* (1592) nor in the first edition of his *Ecphrasis* (1606). It is in the second edition, however, which appeared in 1616 that we find a full account of the plant with figures. He calls it *Flos solis Farne-*

sianus sive Aster Peruanus tuberosus. The first name it received in honour of Cardinal FARNESE, to whom he had dedicated his work, and in whose garden at Rome he had seen the plant growing ; the second it derived from that of the Sunflower *H. annuus*, which was then known as *Chrysanthemum Peruvianum*. LACAITA points out that we must not conclude from this that COLONNA necessarily believed that the plant was derived from Peru but merely that it is a tuberous Sunflower. Later, in the 1648 edition of his work, COLONNA definitely derived them from the Indies, a term, however, which applied to the Americas generally.

Before we leave this rather scanty account of the introduction of *H. tuberosus* to Italy, it is pertinent to enquire as to what was the name given to the new root by the Italian people. In MORETUS's 1644 edition of REMBERT DODOENS Cruydt-Boeck, it is spoken of on pp. 421-2 as *Chrysanthemum Canadense*, or *Herba solis tuberosa*, which may be taken as evidence that at that date he knew of no common Italian name for this plant, for neither of these would have been acceptable terms to the housewife or the frequenters of the market. In the 1738 edition of the Vocabolario della Crusca, the tubers of Helianthus are called *tartufi bianchi*, a term which is still used in the form *tartufo bianco*. In TARGIONI-TOZZETTI's Dizionario botanico (1809) are found the terms Patata Americana, Patata del Canada, Tartufo bianco, Tartufo di Canna, Topinambour and, for the first time, Girasole del Canada. In modern Italian dictionaries only Topinambour or Topinambo and Tartufo bianco are given.

As regards the place of origin and the date of reception of the tubers in the Farnese Garden, I have received some valuable suggestions from Sir D. PRAIN. COLIN, as already noted, tells how far the cultivation of this plant had advanced in the south of France ; by 1614 it may well have reached Lyons, whence its eventual transfer to Rome would be along the ordinary traffic route. The accepted date for its introduction to the garden is 1616, the year of publication of COLONNA's book, but PRAIN has pointed out that the Vatican certificate of its religious innocuousness is dated 1615 and that although COLONNA gives a plate to the growing plant showing the tubers in the soil, he does not devote a separate illustration to the fruit, but promises to do so at some later date. All of which suggests that the plant was a newcomer, probably in its first year in the Farnese Garden in 1614, and that it was derived from the French stocks.

We must now follow our quarry to the Lowlands and to England. In JOOST VAN RAVELINGEN 1618 edition of DODOENS Cruydt-Boeck is an account of our plant, and there he tells how PETRUS HONDUS, a famous gardener of Terneuzen, planted a small shrivelled-up tuber on February 28, 1613, and on the 13th of November collected an amazingly large crop of tubers twice the size of the original. He proceeds to tell us that :—

" This plant was first brought to this country from the French Indies that are called Canada, although it does not multiply its roots

there so much as here, nevertheless here it does not bloom, except when the summers are hot and there is a long drought. The right name of this plant is unknown to us, but Petrus Hondius calls it Artichoke under the ground, in Latin *Chrysanthemum Canadense tuberosum edule*. Others call it *Batatas Canadense*, that is Batatas of Canada; others *Flos Solis Canadensis* or *Herba solis tuberosa radice*, that is, sunflower with tuberous roots from Canada; others *Helenium Canadense* or *Solis herba Canadensis*; others *Heliotropium Indicum tuberosum*; in our speech Artichoke-apples of Ter-Neusen, or Knobs, Tubers or Hundred-heads, because the describer of New France held the same for *Asphodelus Plinii*. The inhabitants of Canada eat these roots as a dainty though common dish." [Translation from LACAITA.]

From this it is clear that HONDIUS was growing *H. tuberosus* at a date at least as early and possibly earlier than the Cardinal FARNESE. LAURENBERG in his *Apparatus Plantarum primus* (1632) retells the tale of PETRUS HONDIUS and says that the tubers reached Holland thirty years ago or thereabouts. LACAITA has devoted much study to this question of dating, which would make it appear that HONDIUS had received the tubers in 1602 and that he, and not the French, therefore should be regarded as the first to have introduced the new plant to Europe. LACAITA finds excellent reasons, however, for disputing this claim, the chief of which is that there were no Dutch Expeditions to Acadia during the years 1600-1612. That LAURENBERG says he has never come across any prior description of the plant shows that he had not read RAVELINGEN's account of 1618. That while LAURENBERG's statement as to the date of its introduction, viz., "thirty years ago or thereabouts" before 1632 is vague, RAVELINGEN's is precise and actually states the day of the month on which HONDIUS first planted the tuber in 1618.

Both RAVELINGEN and LAURENBERG state that HONDIUS received his tubers from America; the shrivelled condition in which they arrived is itself evidence of their long journey and rules out the suggestion that they might have come from the Paris stocks. It is indeed very probable that these particular tubers were sent him by BIARD who had shown so much interest in the new roots.

LAURENBERG closes his account with the statement that HONDIUS had given tubers to all his friends and thus brought about its dispersion throughout Germany and Europe. Notwithstanding this, we shall see that England obtained its first tubers from France.

The first notice of *H. tuberosus* in England has already been referred to: it was by Dr. VENNER of Bath who straightway speaks of it as "Artichokes of Jerusalem" and then discusses its virtues which were not highly praised:

"It breedeth melancholy, and is somewhat nauseous and fulsome to the stomacke, and therefore very hurtful to the melancholick, and them that have weak stomackes."

Sir D. PRAIN has called my attention to an interesting reference to the "Artichoke of Jerusalem" which FRANCIS BACON, first Baron VERULAM and Viscount ST ALBANS, makes in his essay on Plantations in which he advises the colonists to take some of the roots with them. BACON further counsels the emigrants to avoid the mistakes made by the managers of the Virginia Settlement, of which he spoke with knowledge seeing that he himself was a 'grantee' under the 1609 Charter. It seems very probable that he is directing his advice to the Pilgrim Fathers who had left in the Mayflower in September 1620, and that he wrote it about that time. The essay was not published till 1625, by which time BACON had fallen from power. It is curious that so profound a scholar and so informed a man of the world should have been guilty of preaching the "carriage of coals to Newcastle."

The next author to describe *H. tuberosus* is PARKINSON in his Herbal published 1629, who calls it The Potato of Canada: he comments on the diversity of names it has already acquired and goes on to say:—

"We in England from some ignorant and idle head have called them Artichokes of Jerusalem, only because the root, being boiled, is in taste like the bottom of an artichoke head: but they may most fitly be called Potatoes of Canada, because their roots are in form, colour and taste, like unto potatoes of Virginia but greater, and the French brought them first from Canada into these parts."

PARKINSON may have blundered into the trap already laid by GERARD with regard to the origin of the potato, but what is of importance is that whilst he railed against the use of the word 'artichoke' he accepted that of 'Jerusalem' without demur, nor did it occur to him to explain 'Jerusalem' as a corruption of 'Girasole.' May we not assume of one so learned that it was because the word 'Girasole' failed to convey to him anything suggestive of the plant under consideration?

Following PARKINSON, comes the account of the new plant in THOMAS JOHNSON'S edition of GERARD's Herbal (1636). He gives new and valuable information. In the first place the roots were brought to this country by a Frenchman called FRANQUENIL and given to JOHNSON'S great friend, JOHN GOODYER, in 1617. GOODYER grew them and with the proceeds stocked, as he says, Hampshire. On October 17, 1621, he communicated his information to JOHNSON who dismissed the vexed question as to whether they originally came from Canada, Peru or Brazil, with the words: "but this is not much material, seeing it now grows so well and plentifully in so many places in England."

After this, it is disappointing to learn Mr. GOODYER'S opinion of its merits: "But in my judgement, which way soever they be drest and eaten, they stir and cause a filthy loathsome sticking wind within the body, thereby causing the belly to be pained and tormented; and are a meat more fit for swine than man. Yet some say that they have usually eaten them, and have found no such windy quality in them."

(To be concluded.)

THE BOTANIC GARDENS, GLASNEVIN, DUBLIN.

By J. W. BESANT

THE national Garden of Ireland was founded in 1790, the Irish Parliament of that time voting £300 to the Dublin Society (now the Royal Dublin Society) towards this purpose.

A beginning was made by the purchase of 16 acres of ground at Glasnevin, and here for 150 years the Garden has remained. Extensions and additions have been made from time to time, the last in 1898, and now the area is approximately 53 acres.

In 1877 the Royal Dublin Society relinquished control of the Gardens, which then came under direct government control and were included in the institutions administered by the Department of Science and Art. In 1901 they were transferred to the Department of Agriculture and Technical Instruction. In the rearrangement of Public Departments which took place some years ago the technical side was placed under the Department of Education but the Botanic Gardens remained under the Department of Agriculture.

Few botanic gardens are ever placed on an ideal site and this one is no exception. The contours are pleasantly diversified, but the soil is for the main part poor, gravelly and with a high lime content. There is also exposure to wind from almost every direction and a rainfall rarely exceeding 30 inches per annum, and often less. That a considerable amount of success has been attained in establishing collections of trees and shrubs in the open is a tribute to the skill and hard work of generations of officials and workmen of other days.

When first laid down the Gardens had a strong agricultural bias, agriculture in Ireland having always been a matter of chief concern to the Royal Dublin Society, along with many other activities the benefits of which are seen to-day. As time went on and other means of agricultural education were developed this aspect was gradually curtailed and increased attention was given to developing the botanical and horticultural needs of the country.

This led to the acquisition of large numbers of hardy and indoor plants and their arrangement in classes and sections. With the enormous increase in the number of introduced plants and the gradual increase in the area of the Gardens much of the original arrangement had to be modified, and in many cases new collections have been planted on other sites. But many original trees remain, including some, no doubt, in existence when the first ground was purchased, part of which at least had been a private demesne.

It may not be inappropriate to refer here to some of those who took part in the work of developing the Gardens. The first Curator was Mr. JOHN UNDERWOOD, A.L.S., who had been recommended by CURTIS,

founder of the Botanical Magazine. Dr. WADE, who was the Dublin Society's Professor of Botany, was scientific adviser. The Assistant Curator was Mr. JOHN WHITE, an authority on indigenous grasses. UNDERWOOD was succeeded in 1834 by Mr. NINIAN NEVIN, a man of great energy, who in the course of four years carried out great improvements, both in the grounds and in the hothouses. He also, according to REYNOLDS GREEN, introduced a new class of Assistants and a general system of professional instruction. NEVIN was succeeded, in 1838, by DAVID MOORE, who had been Assistant to Dr. MACKEY at the College Gardens, Ball's Bridge. DAVID MOORE held office for forty years and became one of the best-known and most successful botanist-gardeners in Europe. In addition to greatly increasing and improving the collections at Glasnevin he made an intensive study of the native plants, and was given the degree of Doctor of Philosophy (*honoris causa*) by the University of Zurich for his work on Irish Cryptogams. He was followed in 1878 by his son Mr. F. W. MOORE, who like his father had been in the College Gardens at Ball's Bridge and had previous experience in Holland and Belgium. He was knighted in 1911 for his services to horticulture in Ireland, and retired in 1922 after forty-three years' active work. Several additions to the grounds were made during Sir FREDERICK MOORE's time and the indoor collections were greatly improved and enlarged. Due perhaps to his early continental training, he was particularly interested in tropical plants, among which he had much experience at Leyden and Ghent; consequently the collections of Palms, Cycads, Orchids and other plants usually classed as stove plants in those days became very well known. The end of the last century and the early years of this saw great developments in botanical exploration and a considerable accession to the number of hardy plants introduced to gardens. Trees, shrubs, herbaceous and alpine plants became more and more prominent and important until now it is becoming a problem how to find room for all. As the world is at present there may be a slowing-down of collecting, but the hybridist is ever busy and, although a botanic garden must not contain too many of hybrids and florists' flowers, nevertheless horticulture will not be denied and cannot be ignored, otherwise the science of botany would lose much of its practical application and a very great deal of its appeal to the general public.

Nevertheless a considerable quantity of material is supplied every year purely for teaching purposes. Thousands of specimens are collected and supplied to the Universities, Veterinary College, Technical Schools and Art Schools, and much teaching is done in the Gardens by lecturers and professors accompanied by students. Examination material is supplied for all examinations in botany, forestry, horticulture and pharmacy. For these purposes many plants are grown that are not of great interest to the horticulturist or arboriculturist.

Plants of more general interest form, however, the bulk of the collections. On entering the Gardens for the first time the visitor will probably be struck by the number of trees and shrubs, of which

there are representative collections. Few of the trees are of outstanding dimensions, but many are of very considerable size and the majority typical, whereby a good idea can be formed of the probable suitability of the various species for different purposes. As the soil is limy, trees and shrubs growing well at Glasnevin may be safely planted in most parts of Ireland, as in most districts in this country lime is present in the soil.

The collection of Conifers is fairly complete, although difficulty is experienced with some lime-haters such as species of *Athrotaxis*, *Saxegothea*, and perhaps *Dacrydium*, most of which seem tender.

The majority of the Pines, including *P. Montezumae*, do well, but some other South American species, such as *P. patula*, *P. leiophylla* and *P. pseudo-strobus*, are definitely tender. Firs and Spruces do tolerably well, but the Douglas Fir dislikes the lime and never attains the fine proportions seen in acid soils. Larches and Cedars are at home, a weeping specimen of the Atlantic Cedar being one of the features of the Pine Hill. Cypresses, Junipers, Thuyas and Yews generally grow well, as do the allied *Cephalotaxus* and *Torreya*, but most of the species of *Podocarpus* suffered badly during last winter, some of them being almost if not quite killed.

Broad-leaved trees are well represented in the Gardens and are planted for the most part in collections; Sycamores, Maples, Ash, Birch, Alder, Oak, Walnuts, Hickories, Beech, Elm, Poplar, Chestnut, Thorns and the evergreen and deciduous Hollies, all planted in collections, cover many acres, and the specimens are yearly becoming more interesting as they increase in size and assume their characteristic form. Along the banks of the river Tolka many species of Willow are planted, some specimens of *Salix vitellina* and *S. alba* having attained a large size. A good collection of Planes (*Platanus*) is also to be seen along the bank of the river. Other trees, such as the Tulip trees, of which only one or two species are known, are found in various parts of the grounds. The Cherry family (*Prunus*) and the wild Crabs and Pears (*Pyrus*) form other collections, and many of the best varieties and hybrids of both occupy prominent positions near the main walks and other vantage points.

Shrubs, both deciduous and evergreen, take up a good deal of space, and here the plan of planting the species together as far as possible has also been followed. This facilitates reference but cannot be carried out in its entirety, as all species will not flourish under the same conditions. Some need more shelter, shade or moisture than others and more suitable conditions have to be sought for them. Many of the less hardy kinds are planted against walls, of which there is a considerable extent. Others are grown in narrow borders flanking the ranges of plant houses.

In a limy soil shrubs of the family Rosaceae generally flourish, hence Cotoneasters, of which there are now so many species, are well represented, and also the species of *Rosa*, of which there is a good collection and many individual specimens planted throughout the

grounds. Collections of Lilacs, Philadelphus, Diervilla, Spiraea and Deutzia contain many species of botanical and horticultural interest, and, of course, shrubs of the Leguminosae, including the Brooms, are numerous.

Thirty years or more ago, when Chinese plants were being raised in quantity from seeds, it was found impossible to accommodate them all in the older collections, hence new plantations had to be made. These took the form of wide shrubberies containing practically nothing but trees and shrubs of Chinese origin. They are now of much interest and, although all the shrubs are not of equal horticultural value, many have become well known and in time others will find a place in parks and gardens.

Herbaceous plants occupy much space and horticulturally as well as botanically are of equal importance with trees and shrubs—in fact the average visitor is more interested in them, since comparatively few trees and shrubs can be accommodated in a small garden, while room can be found for a considerable number of herbaceous and alpine plants.

For botanical reference many herbaceous plants are grown together in families arranged in a series of irregularly shaped beds. These are largely used by students studying systematic botany.

For display there are two long borders 12 feet wide separated by a path. These contain all the best of the species and garden varieties and receive most attention from those interested only in the horticultural aspect. They contain many bulbous plants and in early spring a proportion of so-called spring-flowering plants such as Polyanthuses, Forget-me-Nots, Wallflowers, etc.

In another border a large collection of the best Daffodils is grown, succeeded in summer by groups of modern half-hardy annuals.

It will thus be seen that the horticultural side is by no means neglected.

The rock garden, with adjacent scree and bogs, is of fair extent, and most of the dwarfer plants associated with rock gardening in the popular sense find a place : for many of those disliking lime special provision has to be made, and this, as in the case of Rhododendrons and other Ericaceae, entails some additional labour and subsequent care.

The water garden nearby contains a good selection of Water Lilies, white, pink, yellow, and deep red, as well as other aquatic plants, and many Astilbes, Spiraeas, Rodgersias and Senecios are grown in beds round the margin.

Lilies, Irises, Crinums and a host of other bulbous, tuberous and rhizomatous plants of botanical and horticultural interest are cultivated, many of them in the more sheltered corners and bays about the conservatories. One particularly notable plant is *Hippeastrum Ackermannii*, which annually produces many stout scapes each bearing several deep crimson flowers.

As mentioned above, the conservatories contain a large collection

of plants from tropical and temperate regions, far too numerous to mention in detail. A great feature in summer is the giant Water Lily—*Victoria regia*—with leaves 6–8 feet in diameter and large scented flowers which open white and fade off pink, in succession till late in the autumn.

Tree ferns, filmy ferns, and species of many other fern genera, together with their allies the Selaginellas and various tropical club mosses, occupy several houses, and a large double span-roofed house is devoted to succulent plants, including those of the true Cactus family.

An ample range of propagating houses with the requisite yard space and a considerable area of nursery ground ensures a continual supply of plant material for the conservatories and grounds.

PLANTS TO KEEP IN MIND.

CHRYSANTHEMUM (LEUCANTHEMUM) DEMNATENSE.

By B. O. MULLIGAN, N.D.H.

THE illustration (fig. 99) is of a flourishing plant of this Moroccan species in the garden of Mr. F. W. MILLARD, V.M.H., at Felbridge, near East Grinstead.

The species, which is nearly related to the well-known *C. Mawii*, was first described by MURBECK in 1923. Seeds were collected by Mr. E. K. BALLS in Morocco in June 1936 at an altitude of 7,000 feet (no. 2782), from which source the plant illustrated was probably obtained.

The much-cut leaves are distinctly grey in hue, like so many of these alpine Chrysanthemums; the flowering stems rise from a woody base to a height of a foot or thereabouts, each bearing in June a single pale pink flower with deeper colouring on the reverse of the petals and a dark reddish central disc.

Mr. BALLS states that it has a preference for screes of non-calcareous rock, descending to about 4,000 feet and growing in Oak and other scrub on the hillsides. In gardens a well-drained position in full sun is essential, in a scree if available, a crevice between two rocks, or in a dry wall. It also makes an admirable specimen for the Alpine house. Propagation should be by means of seeds sown either when ripe or in early spring, or by cuttings taken in summer. This latter method is recommended when it is desired to increase an especially fine or well coloured form. In a winter like the last it is not too hardy even in an Alpine house, so that due precautions should be taken for protection if necessary during winter.

BOOK REVIEWS.

"The Alphabetical Iris Check List." Edited and compiled by Ethel Anson S. Peckham. 8vo. 582 pp. (The American Iris Society, Baltimore, 1939.) Price \$4.

This is a revised edition, brought up to date, of the Check List published by the American Iris Society in 1929. It now contains about nineteen thousand names of Iris—species, varieties and synonyms. Under each heading is given the name of the raiser and the date of introduction or registration, alphabetical headings which summarise the section, season of flowering and colour (e.g. TB-M-S9M indicates a tall bearded Iris, flowering in mid-season, blended medium bitoned red), a list of publications and catalogues in which it has been described or illustrated, awards in both England and the U.S.A. and the synonyms that have been applied to it. Above all, wherever known, and most modern Iris raisers are informative, the pedigree is given, which makes the book indispensable to the raisers of new seedlings. Even an indication of the fragrance is included, but it would be of value to breeders if the chromosome number was given in such cases as it is known. Another feature of interest is a series of biographical notes of raisers and writers about Iris.

The "Check List" represents an immense piece of work which has been most thoroughly and accurately carried out by the Editor, Miss Ethel Anson Peckham.

"Complete Guide to Soilless Gardening." By W. F. Gericke. 8vo. xvi + 285 pp. (Putnam, London, 1940.) Price 12s. 6d.

In the last year or two there has been a small spate in what is called hydroponics, the craft of growing plants on a commercial scale in water with fertilisers, but without soil. As a laboratory experiment, it has been known for eighty years that plants could be brought to maturity in a water culture; indeed one of the earliest experiments in plant physiology was made something like three hundred years ago, when Van Helmont grew a Willow cutting into a tree in a tub of water. He thought the tree had been made out of the water, because he was unaware of the mineral salts he kept supplying as he renewed the water of his tub from well or spring. But it was only in 1929 that Professor Gericke set out to convert the laboratory experiment into a practical method of raising crops. By that time the basic principles had been pretty well established; it was known not only what fertilising elements had to be supplied in the solution, including the four that are only needed in minute traces and had been ignored in the classical experiments of Knop and his successors. The correct concentrations were known and it was understood how the withdrawals by the plant of some elements from the solution would disturb the balance of those remaining until the cultivating medium might become injurious. What had to be ascertained were the practical details that intervene between the laboratory experiment and the commercial process, just as essential to success as the scientific basis.

Of what materials can the containers be cheaply constructed, what are the optimum dimensions, how shall the plants be supported, how shall the roots be ensured a sufficiency of air, how shall the composition of the solution be checked and renewed? Dr. Gericke's initial results were taken up by a number of investigators in the United States, some of whom modified the method by using sand, gravel or cinders to retain the nutrient solution and inventing ingenious methods by which the solution was automatically drained away and returned to the roots of the plant. Dr. Gericke prefers to stick to the "hydroponic" method, in which the roots grow in a liquid substratum, unsupported by any inert solid.

Dr. Gericke's book provides a very lucid and temperate discussion of all the factors entering into the growth of plants in solutions, a discussion which is both easy to read and sound in the principles that it lays down. The book should be in the hands of anyone who is considering whether he shall embark upon business cultivation by this method; it provides him with the necessary groundwork of theory by which he can review his methods. At the same time the reader will find detailed instructions on all the technical points concerning outfit and materials, with notes on the management of particular crops. Dr. Gericke's book will leave the reader with no doubts as to the capacity of the hydroponic method to produce crops of exceptional magnitude for the area involved, and of its freedom from some of the difficulties that beset the cultivator in soil. In this country it is only likely to be applicable to crops under glass—Tomatos, Cucumbers, Carnations and the like; whether it will be economically superior to our standard methods depends mainly upon considerations as to the labour required, the depreciation of equipment, etc., which can only be ascertained by trial.

JOURNAL OF THE ROYAL HORTICULTURAL SOCIETY



Vol. LXV

Part II

November 1940

THE SECRETARY'S PAGE.

AUCTION SALES, BIRMINGHAM, MANCHESTER AND LONDON.

It is very much regretted that the October number of the JOURNAL was late, and that many of the announcements in it on this page did not reach the Fellows and Associates in time, but circumstances are at present such that it is a little difficult to work to a time schedule, and this JOURNAL, like the October JOURNAL, is late. Thus, the particulars of the Manchester Red Cross Sale, which it was desired to bring to the notice of Fellows and Associates through this JOURNAL, have had to be given through the Daily Press.

The Birmingham Red Cross Sale was quite successful, the Lord Mayor of Birmingham opening the second day of the Sale. The thanks of the Society are due to the local Committee, who, with their enthusiasm, contributed greatly to the success of the Auction.

It is very pleasing to report that the number of postal bids for the London Red Cross Sale have exceeded expectations, and it is hoped that by the time this JOURNAL is received many of the purchases will have been dispatched to the successful bidders. At the same time, as our staff are working under difficulties, a little indulgence is asked for if delays occur in carrying out the commissions of the Sale quickly.

THE YEAR 1941.

The year 1940 will soon be drawing to a close and Fellows and Associates will be considering the Society and its work. The Society's work in these days is of great importance; it does not appear in the spectacular form of Shows but in the constant pressure and assistance in the campaign of "Dig for Victory" and "Grow more Food." The

amount of advisory work the Society is doing has in no way fallen, and the importance of vegetable growing has been demonstrated in the Society's Gardens at Wisley.

The Panel of Lecturers has been hard at work and a complete collection of slides on the growing of vegetables has been compiled for the use of the lecturers during the present lecture season.

Besides the utility side of gardening at Wisley, the collections of flowering and other plants have been maintained. The importance of the maintenance of such collections need not be emphasized as it is by this means that the high standards which were attained prior to the outbreak of war will be preserved for horticulture.

The Council therefore appeals, with every confidence, to its Fellows and Associates, in spite of the loss of the Shows, to continue their Fellow- and Associate-ships and thus take their part in maintaining the Society as one of the essentials of National Life.

PUBLICATIONS.

The Royal Horticultural Society's Diary will be obtainable next month. It has been re-edited especially in view of vegetable and fruit culture, and much new matter is available. Owing, however, to the Purchase Tax legislation, the prices of the Diary are increased, but it is hoped that the Fellows and Associates of the Society will support this publication not only by purchasing for themselves but also as seasonal presents. The selling price, *including Purchase Tax*, will be as follows :—

In Pluviusin with back loop and pencil, 3s. 4d. post free.

In Morocco leather with pencil (not refillable), 5s. 2d. post free.

In refillable Crocodile Case with card and stamp pockets, 8s. 3d. post free.

Refills for Crocodile Case, 2s. post free.

DEMONSTRATIONS.

The following Demonstrations will be held at Wisley (weather permitting), and the Director of the Gardens will be glad to hear at an early date from those desiring to attend.

November 6 and 7 (2 to 4 P.M.), Planting Fruit Trees and Roses.

December 4 and 5 (11 A.M. to 1 P.M.), Pruning of Fruit Trees.

LECTURE PROGRAMMES FOR THE AUTUMN AND WINTER.

Applications have been coming in for lectures on food production for the autumn and winter months, and Fellows are reminded that there is a limited number of lecturers and their time is being booked up very

fast, but it is still hoped that as much use as possible will be made of the Lecture Panel organized by the Society in co-operation with the Ministry of Agriculture. The lecturers and demonstrators give their services free and only the cost of out-of-pocket expenses has to be met. Applications should be addressed to the Secretary, Royal Horticultural Society, Vincent Square, Westminster, S.W. 1, giving the time, date and location of the lecture or demonstration.

WISLEY IN NOVEMBER.

IN the last month of autumn flowers are becoming scarce outside and are chiefly to be seen in the shelter of the glasshouses, but compensation is found in the beauty of the coloured foliage and berries of many trees and shrubs throughout the Gardens, principally in the Wild Garden, Howard's Field and Seven Acres.

Beginning first with the Half-Hardy house, nearest the Laboratory, we can still discover some of the hybrid Nerines flowering with pink or scarlet heads, besides the brilliant blue of *Lithospermum rosmarinifolium* which continues to bloom more or less throughout the winter, the pale yellow *Calceolaria Pavonii*, a remarkable species of large proportions, the almost perpetual orange-toned bells of *Abutilon Milleri*, and towards the latter part of the month the first flowers on *Clematis cirrhosa*, a native of southern Europe, hardy in warm situations in some parts of the country.

One of the most outstanding plants in the larger Temperate house is *Epacris ardentissima*, a Heath-like shrub with slender racemes of crimson bells produced over a long period. A little behind it in the border and extending nearly to the roof appear the rich purple flowers and downy leaves of *Tibouchina semidecandra* (*Pleroma macranthum*), an extremely showy shrub for a large greenhouse. Climbing up one of the supports is the evergreen Chilean *Lapageria rosea*, producing long waxen rosy trumpets in succession, and elsewhere are to be seen the shrubby *Alberta magna*, with scarlet, tubular flowers of enduring substance and quality, and probably the first of the Acacia species with spikes or balls of fluffy, yellow blossoms.

Going up to the Alpine house and Rock Garden the beds beside the former should be noticed, where various species of autumnal Crocuses are now flowering, and on a fine day make a pretty display in sunshine. They include such species as *C. cancellatus*, *C. laevigatus*, *C. longiflorus*, and the charming and vigorous *C. niveus*, of the purest white. In the Alpine house *Saxifraga Fortunei* will be one of the few plants in flower, perhaps accompanied by the almost hardy blue South African Daisy, *Aster Pappei*, notable for the length of its season in a cool house, the rosy-purple flowers of *Cyclamen ibericum*, or the white ones of *Iberis sempervirens*, another confirmed winter-flowering plant.

On the Rock Garden the bright blue trumpets of *Gentiana sino-ornata* will still open on a sunny day, and perhaps some also on *G. Farreri* or hybrids of these and other species, of which several have now been raised. The reddish spikes of *Polygonum affine* now have their own beauty and value, and welcome too are the red flowers of the South African *Schizostylis coccinea*, or its pink form 'Mrs. Hegarty.' Both are admirable for house decoration, and thrive even better near the sea or in a milder climate than that of Wisley.

In the Wild Garden are the early flowers of *Viburnum fragrans*, perhaps the best of all winter-flowering shrubs, but the brightest note here is struck by the red or even scarlet foliage of the *Vaccinium* species *V. corymbosum*, *V. virgatum*, *Lyonia (Pieris) mariana*, *Enkianthus* species (some of which turn yellow, others scarlet), *Oxydendrum arboreum*, the Sorrel tree, and its fellow from North America, *Liquidambar styraciflua*, a tree of eventually 50 feet in height, with Maple-like foliage. In a softer pinkish tone is the Japanese Maple, *Acer nikoense*, with trifoliolate leaves. Another planting of *Gentiana sino-ornata* will be noticed here beneath the *Vaccinium* bushes, and again in the Azalea Garden, where the Viburnums, Berberises, and other shrubs vie with the Azaleas to attract attention either for their brightly coloured berries or leaves ; the neighbouring specimen of the Tulip tree, *Liriodendron tulipifera*, changes to a soft yellow hue. For the Heath Garden it is a quiet period when the last flowers of the Cornish Heath, *Erica vagans*, are passing over, and the first of the hybrid *E. darleyensis* are scarcely open, though they are usually visible before the month is out. In Seven Acres there are small, white fragrant blossoms on the evergreen *Osmanthus Aquifolium*, and the first crop on the winter-blooming Cherry from Japan, *Prunus subhirtella* var. *autumnalis*, the second normally coming in March. Berried shrubs are well represented by numerous Berberises, both hybrids and species, and such Cotoneasters as *C. serotina*, *C. frigida* hybrids, and the more or less prostrate *C. conspicua* var. *decora*.

For coloured foliage Berberises are again among the most vivid, especially *B. circumserrata*, *B. Jamesiana*, and *B. virescens* ; other shrubs for this purpose include *Cornus alba*, *Hamamelis mollis*, *Hypericum patulum* var. *Forrestii*, *Rhus Cotinus* var. *atropurpureus*, and the scarlet Oak, *Quercus coccinea* var. *splendens*, of which there is a good example at the eastern end of Seven Acres. In Howard's Field, through the Pinetum, a number of the *Rosa* species are bearing crops of their decorative red or scarlet hips in a variety of shapes and sizes, and can be recommended for this feature as well as in many cases for their flowering qualities.

Of the vegetables in season now, growing on the trial ground in Wisley village, Kales, Brussels Sprouts, Broccoli and Savoys represent the Brassica family, Carrots the root crops, and Celery and Leeks the remainder. All of these can be inspected by anyone interested who wishes to see either the methods used or the varieties grown.

THE KITCHEN GARDEN IN NOVEMBER.

NOVEMBER finds the gardener planning and preparing for another year, and cultivation of the land should be pushed forward without delay. It will be remembered that last year there were several months when the land was either too wet or too frost-bound for any work to be done upon it and those who had not taken time by the forelock and completed the work of drainage and digging in the autumn found the leeway exceedingly difficult to make up in the spring.

The necessity of some plan for vegetable cropping rotation in the coming year cannot be over-stressed because in many gardens it is not possible to dig and manure thoroughly all parts of the garden each year. If, therefore, it can be decided in good time which parts of the garden are to be devoted to the various crops—Brassicas, root vegetables, and, the third crop, pod-bearing and small-seeded vegetables—it will then be possible to concentrate upon digging and manuring the section to be devoted to the third category mentioned above. If the ground for the legumes and small-seeded vegetables, such as Onions, Leeks, etc., is manured each year and the rotation properly carried out, the garden will be kept in a very good state of fertility. The rotation, of course, consists of replacing in the following year the crops of this section of the garden by the Potato and root crops, to be followed by the green crops.

Headway should be made with the clearing and disposal of garden refuse before it commences to decay and form a hiding place for insects on the ground. Yellow leaves of Brassicas should be removed and all the refuse which will easily rot down consigned to the compost heap. It is advisable, indeed strongly to be urged, that the compost heap be maintained at all times. Well-fermented material from the compost heap should be worked into the ground as digging proceeds, and on heavy soils the throwing up of ridges should be practised so that the winter weather may assist the process of breaking down the soil to a fine tilth.

During the next few weeks fresh, strawy stable litter and newly fallen leaves should be collected for use in the preparation of hot beds.

In especially favoured districts only, round-seeded Peas and Broad Beans may be sown during the month, but unless previous experience over a number of years has shown that good results are to be confidently expected it would be most unwise in these times to risk wasting seeds of these crops by sowing at this time of year.

The earthing up of Celery should be completed, and Rhubarb plants required for forcing should be lifted. It is a usual practice, recommended by many gardeners, to allow these Rhubarb plants to lie upon the ground until they have been slightly frosted before taking them into the forcing house.

The last of the vegetables to be placed in store, either under cover or in clamps in the open, should be lifted and dealt with before the end of the month. Special care should be taken that no diseased or damaged specimens are placed in the store.

Parsnips and Leeks should be allowed to remain in the ground as long as possible under the present circumstances. These vegetables are the hardiest of the winter crops, and so long as other winter vegetables are available, either in the gardens or in the shops, it would be wise to refrain from using up Parsnips and Leeks, but to retain them as an iron ration, as it were, for use later in the winter when possibly there may be a shortage of other vegetables.

Commence pruning as soon as possible to prevent pressure of work later in the season. Apples are pruned by shortening the laterals, the extent of shortening depending to a large extent upon the variety. For convenience, varieties of Apples can be grouped as follows : I. Those which bear fruit on short spurs, the laterals being pruned back to three or four buds, this group including 'Cox's Orange,' 'Ellison's Orange,' 'James Grieve,' 'Arthur Turner,' etc. II. Those which bear on spurs of medium length, the laterals being shortened to five or six buds. Those which answer to this treatment are : 'Laxton's Superb,' 'Lane's Prince Albert,' 'Mother,' 'Beauty of Bath,' etc. III. Those which bear terminally or towards the tip of the laterals, such varieties being generally called tip-bearers. With such varieties the system of pruning to adopt is to thin out overcrowding or crossing laterals and to tip extra strong growths so as to maintain vigour. Varieties answering to this treatment are 'Irish Peach,' 'Gladstone,' 'Cornish Gilliflower,' 'Worcester Pearmain,' 'Bramley's Seedling,' 'Lady Sudeley,' etc. The leading growth of each main branch is shortened by one-third of its length. All dead wood and diseased shoots are removed, and should be burned with the other prunings. Pears are pruned on the short spur system with the exception of 'Josephine de Malines' and 'Jargonelle,' which are treated as tip-bearers.

The Red Currant bears similarly to the Apple, and pruning consists of shortening the laterals back to three or four buds and removing a third of the length of the leaders.

Prune Plums growing in the open garden by thinning crowded growths and tipping long laterals. In the case of fan-shaped trees, tie in the short sturdy growths so that they cover the trellis and then remove surplus growths.

With bush Gooseberries thin out overcrowding and weak growths so as to allow light and air to penetrate to all parts of the framework, and then tip the long laterals. Cordon Gooseberries are pruned by shortening the laterals to three or four buds and tipping the leaders.

Prepare the ground for planting new fruit trees and bushes, by bastard trenching the whole area to be planted. For tree fruits do not add any manure, but for soft fruits apply liberal applications of farm-yard manure, and any other humus-forming materials. Never plant when it is wet, as planting can be done any time until the spring.

SPRAY CALENDAR.

THE following spray calendar has been condensed from the very complete Spray Calendar issued by the East Malling Research Station, to the Director of which the Society is indebted for permission to reproduce the information derived from the Station's publication.*

The composition of the washes recommended must be sought elsewhere; tar oil emulsion, petroleum emulsion, lead arsenate, nicotine and derris are insecticides; lime-sulphur and Bordeaux mixture are fungicides. Where strengths are mentioned the quantities quoted are per 100 gallons of spray. The times of application will vary a little with the season and the locality; the proper guide is the state of the blossom. With Apples and Pears three pre-blossom periods are distinguished—"bud burst," when the first leaf tips of the fruit-buds are appearing; "green bud," when the green blossom buds are disclosed; "pink (or white) bud," when the blossom buds show colour but have not unfolded.

Apple.

December or January	. Tar oil (5 gals.) against aphid and sucker.
Mid-March .	. Petroleum oil may be used against capsid, red spider and caterpillar, but take advice from the local horticultural adviser. Both tar and petroleum may be replaced by a di-nitro-cresol wash in March.
Mid-April (green bud)	. First lime-sulphur wash ($2\frac{1}{2}$ gals.) against scab.† Lead arsenate (2 lb. powder) against caterpillar.
End of April (pink bud)	. Second lime-sulphur wash (2 gals.) against scab.†
May (petal-fall) .	. Third lime-sulphur (1 gal.) against scab and red spider.‡ Nicotine (8 oz.) against aphid and sawfly.

If scab has been bad in the orchard, a further lime-sulphur spray ($\frac{1}{2}$ gal.) may be applied in June.

Pear.

December or January	. Tar oil (5 gals.) against aphid.
March (beginning of "green bud")	. Bordeaux mixture (4 lb. bluestone, 6 lb. hydrated lime) against scab. Lead arsenate against caterpillar.

The application of Bordeaux may be repeated at the white bud stage and again when petals have fallen.

* Certain details in the calendar have been revised (1940) by East Malling Research Station.

† Omit 'Stirling Castle.'

‡ 'Stirling Castle,' 'Lane's Prince Albert,' 'Beauty of Bath,' 'Rival,' 'Belle de Boskoop,' 'St. Cecilia' and 'Newton Wonder' (sometimes) are sulphur-shy and should not be sprayed post-blossom with lime-sulphur.

Plum and Damson.

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| December or January . . . | Tar oil (5 gals.) against aphid. |
| February . . . | If red spider has been bad in the previous season—petroleum oil (4 gals.). |
| Pre-blossom . . . | Lead arsenate if caterpillar is in evidence. |
| Mid-May . . . | Lime-sulphur (1 gal.) for red spider. |

Cherry.

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| December or January . . . | Tar oil (5 gals.) against aphid. |
| Petal-fall . . . | Lead arsenate (2 lb. powder) against caterpillar. |

Peach and Nectarine.

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| December . . . | Tar oil (5 gals.) against aphid. |
| February (as buds are beginning to burst) | Lime-sulphur (3 gals.) against leaf curl. |

Black and Red Currants.

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| December or January . . . | Tar oil (5 gals.) against aphid. |
| April (pre-blossom) | Lime-sulphur (2 gals.) against big bud. |

Gooseberry.

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| December . . . | Tar oil (5 gals.) against aphid. |
| April (pre-blossom) | Lime-sulphur (2½ gals.) against mildew, repeated (½ gal.) after blossom * if necessary. |
| Post-blossom . . . | Lead arsenate (2 lb. powder) against sawfly. |

Raspberry.

If cane spot is present, Bordeaux mixture (12 lb. bluestone, 18 lb. hydrated lime) or lime-sulphur (7 gals.) in March; repeated immediately pre-blossom—at one-third previous strength.

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| End of June . . . | Derris against Raspberry beetle, when 'Lloyd George' Raspberry shows first coloured berries. |
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Loganberry.

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| Mid-May . . . | Bordeaux mixture (4 lb. bluestone, 6 lb. hydrated lime) for cane spot. Repeat towards end of August. |
| Mid-June . . . | Colloidal copper as makers' instructions for cane spot, with Derris for Raspberry beetle. |
| End of June . . . | Derris for Raspberry beetle. |

* 'Leveller' and 'Yellow Rough' are sulphur-shy varieties and should not receive lime-sulphur, but may be sprayed from time to time with 20 lb. washing soda and 5 lb. soft soap per 100 gals.

TALL BEARDED IRISES OF YESTERDAY AND TO-DAY.

By B. R. LONG.

THIS year is a centenary of great interest to those who grow Irises, for it was in the year 1840 that the first extensive collection of garden varieties of tall Bearded Irises was named, exhibited, and offered to the public. In France, M. LÉMON published in the *Annales de Flore et de Pomone* a list of one hundred varieties which he had raised and named ; he had commenced to exhibit them in the same year. There had been Irises before LÉMON's, but only a few had been named. DE BURE, a French amateur, named one 'Buriensis' after himself in 1822 ; I do not know whether it still exists, but 'Belgica,' the second variety to have a name recorded, in 1830, was in the Wisley Trials in 1828, as also was 'Bergiana' or 'Bergi' of slightly later date. 'Venusta' of 1833 I once saw in the Glasnevin Gardens. There were also in existence several varieties attributed to JACQUES, a celebrated professional gardener ; of these, the variety 'aurea' is still grown.

Much earlier there are references in early gardening books going back to the sixteenth century to the raising of Irises from seeds, and to the wide range of colours obtainable. But to LÉMON goes the credit for having given the Iris a place of importance among other flowers. The more I look at old gardening periodicals and books of the period, the more impressive is the nature of his attempt and achievement. Flower gardening was already highly specialised ; the number of florists flowers was considerable ; this elect body included the Rose, Carnation, Pink, Pansy, Auricula, Ranunculus, Tulip, Hyacinth and Dahlia in great variety, as well as such greenhouse plants as the Pelargonium, Chrysanthemum and Camellia. New varieties of these commanded high prices ; they had been cultivated already for a considerable period, and were grown to great perfection of form and colour, and even when not grown under glass required assistance of frames or other protection to bring them to the desired standard. LÉMON was indeed an original and enterprising man to try to introduce an ordinary hardy plant like the Iris into this select circle, at a time moreover when the cultivation of herbaceous perennials was of quite minor importance.

The Iris is a very long-lived plant ; no less than fourteen of LÉMON's original set of 1840 were in the Wisley Trials in 1828, with others which he introduced afterwards. Additions to his list or in other lists of nurserymen offering his varieties continued until 1863, although LÉMON lived long after that into the lifetime of many of us ; he died at an advanced age in 1895.

Owing to their wide range of colour and good growth, his Irises formed the backbone of most collections up to thirty years ago, and

although now of course superseded, a few such as 'Mme. Chereau' and 'Jacquesiana' are still to be found in some catalogues.

VICTOR VERDIER in France and LOUIS VAN HOUTTE in Holland also distributed LÉMON's varieties, and VERDIER and his son CHARLES introduced some of their own; 'Crépuscule,' a dark violet-purple introduced in 1863, is the best known of their introductions. Here in England notice was soon taken of LÉMON's Irises; in an early number of the first volume of the Gardeners' Chronicle there was an article on them. The writer says, "The great perfection to which nurserymen and amateurs have brought florists flowers in England induces me to call their attention to one which does not yield to any other in beauty or variety of colour. Unfortunately it is but little known and therefore not sufficiently appreciated; I mean the Iris; one year's successful cultivation would give it fellowship with the Auricula, Pink, Heartsease, or Dahlia, and ensure it a place in every spring exhibition." He goes on to give a list of the best sorts grown in France, mainly those of LÉMON with the few earlier introductions. The article is headed "Paris, May 31st" (1841), and unsigned; it may very well have been written by JOHN SALTER, later to be known as the first raiser of Irises in England. At this time SALTER had nurseries in London and Paris, and exhibited Dahlias and Chrysanthemums in both. He was an advertiser in the Gardeners' Chronicle at the time, but he was not the first to advertise Irises in it. In the Gardeners' Chronicle for November 13, 1841, WILLIAM DENNIS & Co., King's Rd., Chelsea, advertised "a choice selection of Paeonias and tuberous Irises about 40 varieties each." Unfortunately no names were given. The following year the Paris correspondent wrote again about the Iris. "It is a very few years since the colours of these species were almost entirely confined to the different shades of blue, purple and yellow; now they are nearly as diversified as the Dahlia or the Tulip, and scarcely inferior in elegance of pencilling. From artificial impregnation of *germanica*, *plicata*, *Buriensis*, *Swertii* and *pallida* totally new colours have been produced and the beautiful mixtures . . . give abundant proof of what may be done by judicious hybridization."

This article is of particular interest as it definitely states that these varieties, of which a list of forty is given—LÉMON's varieties—were produced by judicious hybridization, and were not the result of sowing chance seed pods.

I have dealt at some length on LÉMON's work, so I must be more brief with his immediate successors. Additions were made by JOHN SALTER between 1850 and 1868, 'Queen of May' being his best variety, and ROBERT PARKER between 1873 and 1880; 'Darius' and 'Cordelia' were of his raising.

Occasionally, in the 'eighties and 'nineties, other varieties were put into commerce by the firms of BARR, and WARE, the French growers having for a time lost interest.

All these varieties trace their descent from two European species,

I. pallida and *I. variegata*, and from natural hybrids from them ; before turning to consider the results of the introduction of other species, probably of Asiatic origin, it will be better to follow the story of the later stages of the development of varieties descended from these two European species into the first decade of the present century. EUGENE VERDIER, a son of VICTOR VERDIER who had introduced some Irises about 1860, died in 1902. His Iris collection was acquired by VILMORIN ; it was then found that there were a number of excellent varieties of his own raising. A selection of the best of these was sent out by VILMORIN between 1904 and 1912 ; they were a decided advance. 'Jeanne d'Arc,' 'La Neige,' 'Mercedes,' 'Prosper Laugier' and 'Edouard Michel' are still well remembered. There was also a small collection of VILMORIN's own varieties derived from the older named varieties, of which the best were 'Monsignor' and 'Parisiana' ; and two other French raisers, CAYEUX and MILLET, both later to become much more important, raised a few good Irises of which 'Ma Mie' by CAYEUX, and 'Col. Candelot' by MILLET were the most notable. A little later MILLET sent out 'Souvenir de Mme. Gaudichau' in 1914 ; it was raised from a cross of an old variety of LÉMON's, 'Fries Morel,' crossed by *I. pallida* var. *dalmatica* ; it is probably the best Iris ever raised from varieties descended from the original European species.

In Germany, a set of varieties of remarkably high quality was raised by GOOS and KOENEMANN ; they were excellent garden varieties. Five of them, about half of the original set, gained Awards of Merit in the Wisley Trial of 1916—nearly one-third of the Awards of Merit given. 'Iris King' and 'Rhein Nixe' were the best of them and not until very recently was there a better Iris with white standards and purple falls than 'Rhein Nixe.'

Though LÉMON's varieties reached America before 1860, no one began the raising of new varieties there until FARR started about 1905 ; that pretty little Iris 'Quaker Lady' was one of his first introductions which were sent out in 1909.

By this time there was already a number of varieties raised by crossing the older named varieties with Asiatic species ; these varieties excelled the best of the older ones derived from the European species, and it was not to be expected that any considerable number more of the older type would be introduced ; the vein was nearly worked out, though an occasional gem might still be gained from the old workings.

But between 1917 and 1921 there was sent out a considerable number of varieties of what I may call the older type, which had been raised by A. J. BLISS. They form a rather curious episode in Iris history. About the year 1902 BLISS started breeding from a very small collection of the varieties then obtainable ; about a dozen names are all that appear in the pedigrees published much later. His primary object seems to have been investigation of problems of colour heredity—the varieties he used appear to have been selected so as to give a fairly representative colour range on a small scale. A very large

number of varieties raised from this small and rather uninspiring collection was named and introduced. No less than thirty-three of them were plain first crosses between these old named varieties, and showed no particular advance on them. They were not by a long way up to the standard of the VILMORIN, VERDIER and Goos and KOENEMANN varieties which had preceded them—in some cases years before—and which were already well known in this country ; at the Wisley Trials in 1916 two-thirds of the awards were secured by these continental varieties, and that although only a few of the VILMORIN varieties were represented. BLISS must have been unaware of the progress that had been made abroad since 1902. Later he did realize that some apology was needed. In a letter to an American correspondent, published in the American Iris Society's Journal after his death, he wrote, " I was tempted and I did not realize the inadvisability of letting second-best stuff go out. It seemed better to have a few pounds in my pocket instead of throwing the plants in the river."

Again, in 1919, even before the flood of this "second-best stuff"—a rather optimistic estimate by the way—was at its worst, he was writing, "the improvements I have got since have made me feel a bit ashamed of some of my earlier seedlings."

It is a puzzling problem, that anyone devoting much time to the Iris should have been so little informed as to what other raisers were doing. In the article he wrote for the Iris Conference held in Paris in 1922 he describes his unsuccessful efforts to get any Iris redder than those with which he started, but does not even allude to such varieties as 'Archevêque,' 'Colonel Candelot,' 'Deuil de Valérie Mayet,' and 'M. Cornuault,' which were then already in commerce some time, and were much redder than any he had raised.

Eventually the pedigrees of nearly all BLISS's varieties were published—apart from those raised from 'Dominion,' about which an unscientific and unnecessary secrecy was preserved—and the interesting fact emerged that very nearly all were simple first crosses between named varieties by LÉMON, SALTER and other older raisers, or between such varieties and species. A very few were second crosses, but even here he mostly depended on crossing an old named variety with one of his own ; only four of the long list of his varieties were third generation. So there was no careful building up of improvement by selection of successive crosses over a period of years. It would be interesting to know why he did not attempt more with his own seedlings, or why he kept to such a small collection of named varieties. The question arises too why this mountain of time was required to raise such a set of mice. As he started in 1902, one would expect the second generation of his seedlings to have appeared in 1906, the third in 1908, and thereafter, at the rate of a generation every two years, he should have reached the eighth generation in 1918. But he never seems to have got beyond the third generation—and this he considered a long pedigree ! It only takes six years, and six years is a short time in gardening.

BLISS's 'Dominion' varieties are of course quite another matter; they in some cases were outstandingly good, and put him among the leaders of Iris raisers for a time. I shall refer to them later.

I shall now turn back to the introduction over fifty years ago of various Eastern species which are probably natives of Asia. In the late 'eighties there reached Europe several purple-flowered species which were taller and larger flowered than anything known previously, and with widely branching stems. Sir MICHAEL FOSTER received these from various sources and was the first to describe and name several of them. Those which were of the most importance in the subsequent development of the Iris were *Amas*, *cypriana*, *trojana*, and another introduced somewhat later, *mesopotamica* or *Ricardii*. Although FOSTER was the first to cultivate several of those species it appears that he did not at first think of using them for hybridizing—the well-known varieties which he raised, such as 'Lady Foster,' were distributed some years after his death in 1906, and there is reason to suppose they were raised not very long before that. LYNCH, in the Book of the Iris, published in 1903, does not allude to any use having been made of these species although he was familiar with FOSTER's work—LYNCH was curator of the Cambridge Botanic Garden, and FOSTER lived at Shelford not far away. Neither the late Mr. YELD nor the late Sir ARTHUR HORT seems to have seen them on visits to FOSTER's garden; at least they make no mention of having seen them in articles written by them about FOSTER's garden.

It therefore seems certain that the credit for the first use of these species for improvement of the Iris by crossing with garden varieties may be divided between YELD in this country and the firm of VILMORIN in France. YELD was sent several of these species by FOSTER; he did not record the date when his first cross was made, but his variety 'Arac,' raised from *cypriana* and *Amas*, was exhibited in 1900, so that the cross may have been made about 1896 or 1897. 'Arac' was, however, not introduced until 1907.

VILMORIN's record the seedling year of their variety 'Isoline' as 1897; according to DYKES it was a *trojana* cross. It was followed shortly afterwards by a *cypriana* cross, 'Tamerlaine,' raised in 1898, and by 'Oriflamme,' raised from *Amas*. These three varieties 'Isoline,' 'Tamerlaine' and 'Oriflamme' were introduced in 1904, and so were the first Irises raised from crosses of these Eastern species to be made available to the general public. VILMORIN continued to raise and distribute a select set of Irises raised from these Eastern species which showed a considerable and progressive development in size of flower combined with height and branching habit. 'Alcazar,' raised in 1906 and sent out in 1910, was a notable one. It was later considerably used by other raisers, but few, if any, varieties raised from it were up to its own standard. The culmination of their introductions of this period was reached in their famous trio 'Ambassadeur,' 'Ballerine' and *magnifica*, raised between 1909 and 1911, although not sent out until 1920 because of conditions caused by the Great War.

YELD being an amateur and, moreover, living in the North of England, was not in a favourable position for securing early appreciation of his work, but from 1907 onwards such splendid varieties as 'Neptune,' 'Lord of June' and 'Asia' became available. Unfortunately the pedigrees of most of them were not preserved.

FOSTER's varieties were sent out from 1909 to 1913. 'Lady Foster,' 'Crusader' and 'Kashmir White' were wonderful Irises in their day; they, with a few raised by DENIS in France, were perhaps closer to the best modern varieties than any others raised in the first decade of the century. There is no definite record of what they were raised from. 'Kashmir White' is often described as a seedling of the difficult species *kashmiriana*, and was no doubt named on that assumption. But DYKES records that FOSTER told him that this was uncertain, and also that DENIS, who grew several forms of that species, and raised seedlings from them, was definitely of the opinion that it was not a *kashmiriana* seedling.

Another of FOSTER's varieties, 'Caterina,' had a great influence in Iris breeding. It reached America just as the raising of Irises was commencing on a fairly extensive scale; it was used by several of the first American hybridists and so it is to be found a few generations back in the pedigrees of some of the best American varieties, for example 'Easter Morn,' 'Purissima,' 'Mareschal Ney,' 'Pale Moonlight' and 'Rameses,' to mention but a few. Through the American variety 'Gold Imperial,' 'Golden Hind,' one of the most notable Irises introduced in this country in the past ten years, is only three generations from 'Caterina.'

Other varieties raised by FOSTER, such as 'Shelford Chieftain' and 'Nine Wells,' were also used in America to great advantage. It was during the first decade of the century that the largest and tallest form of these Eastern Irises, *I. Ricardii*, began to be used by DENIS in the South of France. I have not been able to find any record of the date at which he started using it, but his first hybrid of *I. Ricardii*, a long forgotten variety, 'Mine Bories,' was introduced in 1907; it was soon followed by a considerable number of other varieties, which gave an extensive colour range of large-flowered tall-growing Irises. At one time I grew many of them; there were some superb flowers among them, though some could not be relied on to flower regularly in this country—they needed more warmth and less wet than we are usually blessed with. 'Mme. Claude Monnet,' a gorgeous purple, one of the best of his earliest introductions, was rather an offender in that respect. DENIS also raised a number of attractive small-flowered Irises—the opposite extreme from his *Ricardii* hybrids. There were some charming and unusual colours; and several, such as 'Mme. Chobaut' and 'Ochracea coerulea,' are still often grown.

DENIS continued to raise Irises for many years; his best period was between 1916 and 1922, when 'Mlle. Schwartz,' a beautiful pale lavender, 'Micheline Charraire,' cream-white, and 'M. Cornuault,' coppery-red, attained general appreciation. They were, moreover,

rather better adapted to our conditions than some of his former varieties.

Looking backwards it can now be seen what great improvements were being made in the Iris between 1900 and 1910, yet there must have been but few who knew of it at the time. Personally, I have been interested in gardening from a very early age, and I can remember various flowers in a garden I left when I was four years old, and many other gardening memories go back into the 'nineties : Daffodils from BAYLOR HARTLAND ; the splendours of those mighty but infrequent blooms of the Roses 'Bessie Brown' and 'Mildred Grant' ; fancy Pansies from a grower in the North of England ; the rare double Pansy—I do not think it exists now—on which I expended the extravagant sum of 2s. 6d. from CANNELL's of Swanley. Bulbous Irises I knew, and some others, but of Bearded Irises, I confess, I have no early memories. It was not until the year 1908 that the revelation occurred. It was in that year that I first saw the Irises in the Glasnevin Gardens, Dublin. Occasionally I have idly wondered of recent years whether the passage of time had not gilded my memory of that Iris border. I took the risk this year of writing to Glasnevin, to ask if there was any record of what was grown there at that time. The Keeper, Mr. J. W. BESANT, was kind enough to send me a copy of a list made in 1909 of what was there then. It was indeed an admirable collection ; about ninety varieties were grown ; sixteen raisers were represented from the earliest beginnings of DE BERG, LÉMON and SALTER to what were then the latest novelties by CAPARNE, EUGENE VERDIER, Goos and KOENEMANN, FOSTER and YELD. The collection was regularly added to, and the VILMORIN varieties followed shortly. They were grown in ideal conditions on a sunny slope, and although many of these old varieties would make a poor showing next to a modern variety, they were free flowering and made a fine effect in quantity. Metaphorically speaking, I lived on that Iris border for some years.

Irises might have continued to develop steadily by the raising of improved varieties evolving from those which had already been raised by 1910 had not chance provided something entirely unexpected, a variety which was, from its effect on the subsequent development of the Iris, as if it were a new species which had been found. This was 'Dominion,' which happened among BLISS's seedlings. He says of it : "'Dominion' was a piece of luck ; I did not even realize in full how good it was until the second or third flowering. I was at that time so engrossed in my aim of raising a crimson Iris that I suppose any not red received scant attention. It was my little niece who really discovered it, confidently affirming one day that it was the best Iris I had." Not only did good fortune fall into his lap, but there was someone to point it out to him when he failed to see it. It seems that it narrowly escaped the river !

When one reflects on the mediocre varieties which he was raising at that time it seems almost incredible that 'Dominion,' which would have been outstanding among the best varieties in existence, should

have escaped his notice. Think of it moreover as not growing among the best Irises then known, but among such "second-rate stuff" as the utterly floppy 'Tartarin,' the thin and pinched 'Princess Toto,' that bunched little weed 'Midas,' and many others long since consigned to a limbo whence they should never have emerged.

However, when the merits of 'Dominion' did at last penetrate, he made good use of it. At first he intended to keep it for himself, but eventually financial considerations prevailed, and 'Dominion' was introduced in 1917 at the then remarkable price of five guineas.

Thereafter followed for several years a series of varieties mostly in deep colours descended from 'Dominion,' which had inherited to a greater or less degree its substance. The other varieties used in raising them were not disclosed, nor in most cases to what extent they were descended from 'Dominion.'

But of those about which some information is to be found, 'Cardinal,' a light red-purple, and 'Duke of Bedford,' a deep blue-purple, were of the first generation; 'Bruno,' a bronze-coloured variety, the second generation, and 'Mrs. Valerie West,' rather deeper than 'Bruno,' the third generation from 'Dominion.' These varieties, particularly 'Cardinal,' 'Bruno' and 'Mrs. Valerie West,' had a considerable influence on subsequent development. In fact for some time their influence was almost excessive as too many deep coloured Irises were produced. But this phase passed fairly soon. The introduction of the "'Dominion' race" marks the beginning of a new period of much more widespread interest in the Iris. Up to then the number of those raising new varieties had hardly exceeded single figures; it rapidly increased until now it is estimated that in America there are some five hundred raisers at the present time. Up to 1930, however, it is still possible to follow the developments by giving an account of the leading raisers and their work; up to that date the majority of outstanding varieties were still being produced in this country and in France, although the American effort was progressing rapidly. First appeared some tall large-flowered varieties raised by Sir ARTHUR HORT from crosses with 'Caterina,' and of the species *mesopotamica*; there were many of them within a small colour range of blues and purples—too many, in fact, and most were none too easy to grow. Popular taste selected the light blue 'Ann Page' as the best; and 'Leonato,' a somewhat lighter shade, an immense but somewhat clumsy flower, had a certain vogue. DYKES, who hitherto had devoted himself principally to species, began to raise a few good garden varieties. He preferred self colours, and exercised much discrimination in what he kept and allowed to be introduced. No records are available as to their origins, which is strange when he himself had had cause to regret that FOSTER left no useful notes about his seedlings. So nothing is known as to how DYKES obtained 'Aphrodite,' a pinkish-purple remarkable for its height, 'Amber,' for a time the best yellow Iris, or 'Moonlight,' an unusual greenish-white which proved in the hands of others of much value for hybridizing, or, most notable of all, that remarkable yellow

Iris named after himself, which set a new standard of size in its colour, and proved invaluable to other breeders. It is not possible to draw a line of distinction between his varieties and those sent out in the few years after his death by Mrs. DYKES, greatest of which was that striking white, 'Gudrun.' Here, too, no information was disclosed as to their origin. Mrs. DYKES once told me that several of the best of her own and her husband's varieties had come from pods which had formed naturally, the flowers having been pollinated by bees. Which those varieties were, however, she did not say.

Then, rivalling those of any other introducer in number, and exceedingly wide in range of colour, came the PERRY varieties of 1921 to 1923. These varieties were distinguished for height and good branching habit, accompanied by fair sized flowers; they included several in new rich colour blendings of apricot and bronze-red. They were also nearly all very good growers. 'Mary Gibson,' almost salmon in effect, and 'Mrs. H. F. Bowles,' a rich brown, were particularly distinct, and there were several admirable blues, such as 'Lady Charles Allom.' 'Nemoralia,' a blended blue, was a particularly delicate and unusual shade, but there were good varieties amongst them in almost every colour. However, nothing is perfect, and these varieties, though possessing many virtues, lacked the size, substance and form of the best 'Dominion' varieties which were then appearing. No details have been published as to the parentage of the PERRY varieties. Others followed, but I do not think Mr. PERRY could ever "quite recapture the first fine careless rapture" of the first set, even though his 1930 introduction 'G. P. Baker' was adjudged the best Iris of the year in this country.

Other firms also began to interest themselves in raising new varieties; among so many, it is not easy to choose a few, but of those of this period which seem most memorable to me there are, among Mr. BUNYARD's varieties, 'Sirius,' a stately blue purple, and 'Lyra,' a blended mauve of high quality; among Mr. WALLACE'S, 'Melchior,' a rich red purple-bronze, and 'Rhodes,' reddish-purple; among those of the ORPINGTON NURSERY Co. by Mr. and Mrs. MURRELL, 'Romance,' a light blended red, and 'Rose Petal,' a refined pink.

In France, VILMORIN'S, after their 1920 introductions, 'Ambassadeur,' 'Ballerine' and *magnifica*, did not again have a similar success, although the late yellow 'Chasseur,' in 1925, and 'Le Corrège,' a reddish-bronze, in 1927, were good Irises.

The firm of MILLET, whom I mentioned earlier, now resumed, and introduced some good hybrids of *Iris Ricardii*: 'Souvenir de Loetitia Michaud,' a fine tall pale blue, and 'Mme. Cécile Bouscaut' were most superior Irises. They continued to send out good Irises until 1930, when they went out of business; a pity, for their last list contained two of their best, 'Huguette,' a silky flower of deep blue-purple, and 'Paulette,' one of the largest and most shapely of Irises in mauve-blue.

But from 1925 on, the third French firm, CAYEUX, gradually took the lead. M. FERDINAND CAYEUX produced a series of splendid varieties. Nowadays, few Irises can expect to hold a place against

newer introductions for very long, but of those introduced by CAYEUX between 1925 and 1930, 'Sensation,' still one of the brightest blues, 'Anne Marie Cayeux,' in blended bluish-mauve and grey, 'Evolution,' a blend of coppery-bronze and blue, and 'Député Nomblot,' in rosy-bronze, are still very good, and there were many others but little below these in merit. They were the results of careful selection from a series of crosses for which some of the best varieties raised by MILLET, VILMORIN, DENIS, YELD and BLISS were the foundations. These varieties have been followed up to the present day by many others in which a remarkably high standard has been maintained, including several fine large-flowered yellows, of which 'Helios' was the first.

America was now coming more and more into the picture ; FARR, as I have mentioned, was the pioneer. About the same time as FARR, E. B. WILLIAMSON also was beginning to grow Irises thirty-five years ago. Though at first he attempted *Oncocyclus* crosses, he soon turned to Bearded Irises, and in 1910 he raised that great variety 'Lent A. Williamson,' from *Amas* crossed with an unknown variety ; it was not sent out until 1918, however. It was followed by other fine Irises, such as 'Dolly Madison,' a very large blended mauve, and 'Mareschal Ney,' a bright brown-red, which has had an even greater vogue here than in America. WILLIAMSON raised seedlings on an extraordinarily large scale, sowing fifty thousand seeds or more each season ; the seeds were sown closely in drills, and allowed to remain where they grew until they flowered, so that any of poor constitution were squeezed out.

Miss GRACE STURTEVANT was also among the first in the field, and the first to grasp the importance of 'Caterina' and others of FOSTER's varieties for breeding ; her variety 'Musqueteer,' raised from 'Cordelia' and 'Caterina,' was shown as early as 1913, though I believe it was not distributed. Many of her introductions were not only excellent in themselves, but have had wide influence on the subsequent development of the Iris in America. She made the first great advances in breeding of taller and larger yellow Irises than had up to then been known, at first using *I. pallida* crosses to gain height ; but 'Flutterby' and 'Gold Imperial' were descended from 'Caterina,' and were remarkable examples of skilful breeding. Other varieties of hers which were much used by other raisers were several in blended shades, 'Nancy Orne,' 'Mme. Cheri,' 'Rose Madder' and 'Sherbert.' Her pink varieties 'Dream' and 'Airy Dream' were long among the best of that elusive colour. There was, moreover, nothing of the wholly unnecessary secrecy about the pedigrees of her varieties which most other raisers at the time still maintained about theirs. All available information about them was published, a most commendable practice, now widely followed.

Two of the most successful of the present-day raisers of Irises in America, the brothers HANS and JACOB SASS, made their start about 1910, though a considerable time elapsed before their work became generally known. They work both separately and in collaboration.

At first their interests lay in dwarf and intermediate Irises, but they turned to the taller varieties; many of their tall Irises have some infusion of dwarf forms in them, which they consider gives greater clarity of colour. In some cases an unexpected increase of the size of the flower has been obtained by such crosses. Of their first introductions, 'King Karl' (1925), by JACOB SASS, and 'King Tut,' 1926, by HANS SASS, are outstanding; the latter, a brilliant red-brown, proved of great importance to breeders. They continue to raise many fine varieties, and some of their latest productions, such as the 'Red Douglas' and 'Prairie Sunset,' are considered to be among the best of recent years.

In the favoured climate of California, *Iris mesopotamica*, that very tall and large-flowered species from Asia Minor, can be grown, and there WILLIAM MOHR began to raise hybrids from it. His first introduction, 'Amador,' a lilac-pink, was sent out in 1920, and was shortly followed by two varieties, 'Conquistador,' a tall blue, and 'Argentina,' white, which proved valuable for breeding purposes. After MOHR's death in 1924 his work was carried on by his friend, Prof. SYDNEY B. MITCHELL, and under their joint names several remarkable varieties were sent out in 1926-27. 'Frieda Mohr,' an immense, light red-purple, 'Los Angeles' and 'San Francisco,' *plicatas* which set an entirely new standard of size, height, and form for this type, and 'Purissima,' still hardly excelled among white Irises, were great achievements. Unfortunately, these superb varieties can only be grown successfully without protection in this country in the most favoured gardens. They need more sun and less rain than we usually get; cold in winter, apart from wet, does not trouble them. There were others in America who were raising good Irises, but those I have mentioned had probably most influence on subsequent development.

It would require several lectures to give an adequate account of all the new introductions or the work of different raisers of them during the past ten years. There are about a thousand members of the American Iris Society—including many here and in other countries—and it is estimated that at least half of that number raise new varieties, and many do so on a considerable scale. The majority who do so raise new Irises for the love of it, but even so, the number whose varieties are commercially distributed has multiplied many times over, more particularly in America. There, some of the best varieties have been raised recently by growers whose names are hardly yet familiar even to those who try to keep in touch with latest developments. With the constant influx of new kinds it is rare for any to keep its place among the best for more than three or four years. There is one well-known specialist who publishes yearly a list of what he considers to be the hundred best Irises. It is interesting to see how rapidly it changes. Of those which constituted the best hundred in 1930, only seventeen remained in the 1935 list, and only four survive in the 1939 list. This provides a very fair index of what is happening, as a very recent selection of the fifty best Irises of the present day by a number of

American growers only includes one variety raised before 1930, and the majority are very recent introductions.

The American scene, however, was sampled last year by Mr. PILKINGTON—although he could not see California, whence come many of the best varieties—and his article in the Iris Society's Year Book for 1939 gives information about many of their latest novelties which have not yet reached us. In this country the market for new varieties is necessarily more restricted, but yearly the number of amateurs who raise new varieties for their own enjoyment continues to grow. Nowadays it is quite the usual thing for an amateur to include seedling varieties of his own raising in a competitive exhibit at the Iris Society's Show, varieties which are at least equal and often superior to those in commerce.

Ten years ago it was treated as a piece of presumption to which an immediate stop must be put, and a rule was passed to that effect. But it did not last very long—as well might the tide be swept back with a broom. It is all to the good that more amateurs should produce their own varieties ; it means a general raising of the standard ; the more competition there is, the better will an Iris have to be, to be worth introduction with any likelihood of sale at a remunerative price, although it is not likely that the somewhat exaggerated values placed on some new Irises in past years will be seen again in this country for many years.

I shall conclude by mentioning a few of the most notable varieties of the last ten years. Among white Irises 'Gudrun,' although open to criticism in many respects, is undeniably spectacular ; it is to be hoped that 'White City,' shown two years ago, is reliably hardy, as it is one of the best of recent years.* Among American varieties 'Snow King' seems to have an established position. There are now some fine hardy *plicatas* : among French varieties 'Mme. Louis Aureau' and 'Seduction' have been much admired, and 'Florentine' is a good new one. 'Spring Cloud,' even larger than 'Los Angeles,' and 'Claribel' are recent Americans. Among the few varieties with pale or white standards and dark falls, 'Shah Jehan' and 'Wabash' are notable additions.

In light blues 'Aline' is the bluest yet seen ; 'Pale Moonlight' most of us here think the best of a set of splendid blues, by Professor ESSIG of California. 'Exclusive' and 'Gloriole,' in palest blue, are very fine ; the latter was, I thought, quite outstanding in its colour at Wisley last year. In deeper blues 'Sierra Blue' and 'Blue Danube' are very fine, and deeper still that admirable Iris, introduced ten years ago, but still a leader, 'Maisie Lowe,' alias 'Mrs. J. L. Gibson.' In pink we still lack something really first class ; 'Constance Meyer' has good points, but nothing has yet arrived in this colour of the same standard that we have in other colours. 'Pageant,' while not so near pink, is nearer what is needed in other qualities. 'Aubanel' is a good

* Awarded F.C.C. in Wisley Trials and Dykes Medal for the best Iris of the year (1940).

blended pink. In red, American raisers have been working hard, but so far only a few of their best have been seen here. 'Cheerio' does not seem to me up to its American reputation, and 'Joycette' is what I call purple, not red; though on the browner side of red, 'Betelgeuse,' which is, I think, older than either, is a home product vastly superior to either of these. Some of the more recent American varieties, however, such as 'Christabel,' 'Marco Polo' and 'Garden Magic,' are getting nearer red, and there is 'Red Douglas' also; 'Copper Piece' was very attractive at Wisley last year, and there is a smallish French variety, 'Brasier,' which is as near red as makes no matter. 'Red Valor,' which has just won a gold medal in the Rome Trials, may prove to be *the* red.

'Louvois' is the best brown by all accounts, and among those with yellow standards and coloured falls 'City of Lincoln,' 'Vision' and 'Torchlight' are distinct improvements.

Yellow varieties of large size and varied tones from cream to deepest yellow are legion: 'Alice Harding,' 'Golden Hind' and 'Sahara' will last a little longer in spite of strong competition. There is also 'Natal' in an unusual shade of greenish cream, a most beautiful Iris. 'Golden Treasure' and 'Fair Elaine' have lighter yellow to cream standards, and deeper yellow falls. 'Naranja' is near orange. Among those of blended colours there are so many it is most difficult to pick a few to mention, but 'President Pilkington,' blended mauve, 'Mary Geddes,' orange-salmon, 'Jean Cayeux,' light golden-brown, and the small-flowered but very bright 'Golden Light' is each outstanding in its own particular way. Much effort is being concentrated in these blended colours in America, and some of the more recent which have not yet reached us, for example 'Prairie Sunset,' may be expected to surpass anything yet seen.

I wonder how this selection will look ten years hence. I do not think that even the most optimistic prophet of progress would have suggested ten years ago that only four out of the hundred best Irises in 1930 would still be considered fit to be of that select company in 1940. Will the next ten years see a similar rate of progress? I see no reason why it should not, and quite possibly even the newest I have mentioned will by 1950 have passed through the bargain basement, and out the back door.

CORRECTION.

It is greatly regretted that an error occurred in the titles of the illustrations of Mr. CRANE's article "Seed and Food in War-time," which appeared in the October issue of the JOURNAL. Fig. 90 is of a Tomato hybrid with Carter's 'Sunrise' and Fig. 92 is of Tomato 'Kondine Red.'

WHY "JERUSALEM" ARTICHOKE?—II.

By REDCLIFFE N. SALAMAN, F.R.S.

(Concluded from p. 348.)

The JEAN FRANQUENIL referred to by GOODYER was a member of a Huguenot family from Bailleul near Cambrai; both he and his son of the same name settled in Canterbury. We learn from PARKINSON that the elder JEAN was a friend of the ROBINS who, father and son, were botanists to the King at Paris, hence we may well believe that the tubers he gave to GOODYER were derived from Paris.

The next problem is to discover, if we can, how it came about that a new plant from Canada, introduced via France, should have acquired the double-barrelled name "Jerusalem Artichoke," the components of which are so completely out of harmony with its origin and character. The use of the name Artichoke has already been referred to and there is no need to say more about it. But that of Jerusalem is a challenge which has been taken up in a most able manner by LACAITA. Here I intend in the main to traverse the same ground, bringing forward, however, some new material in further support of the thesis that "Jerusalem" is not a corruption of "Girasole."

We have, however, somewhat anticipated, and we must go back to 1807, when Sir J. E. SMITH, the founder of the Linnean Society, in his *Introduction to Physiological and Systematical Botany* first put forward the following thesis. It is contained in a note on the same Jerusalem Artichoke and runs:—

"A corruption, I presume, of the Italian name *Girasole Articiocco*, sunflower-artichoke, as the plant was first brought from Peru to Italy, and thence propagated throughout Europe."

SMITH's great reputation and the fact that he repeated it in an article in REES' Cyclopaedia (1819) on *Helianthus tuberosus* was not only sufficient to cause this thesis to be generally accepted but also to perpetuate the errors in respect to the parts played by Peru and Italy.

PEACOCK opens his novel *Gryll Grange* (1860) with an *ex cathedra* statement of the learned Dr. OPIMIAN on the derivation of Palestine soup from Jerusalem Artichoke and the latter from Girasole, and MAX MÜLLER (1868) scented no objection to either.

The first public challenge of SMITH's dictum was made by that distinguished gardener VICARY GIBBS, who, writing in the Gardeners' Chronicle on March 30, 1918, says: "I disbelieve profoundly in this derivation. I doubt if any evidence can be produced that the Italians have ever called this vegetable 'Girasole.'" It was this boldly expressed dissent from accepted opinion which caused Mr. LACAITA to make his searching enquiry into the matter.

SMITH's theory demands the existence in Italy at the commencement of the seventeenth century of a term "*Girasole articiocco*":



FIG. 100. AN EARLY MEDAL PORTRAYING AN ASLLR, STRUCK IN 1417 OR 1448.



FIG. 101. A LATER MEDAL (1629) DEPICTING A SUNBIRD
(See p. 378)

[To face p. 376.]



FIG. 102.—*Rosa Ernestii* IN MAJOR F. C. STERN'S GARDEN AT HIGHDOWN
(See p. 387.)

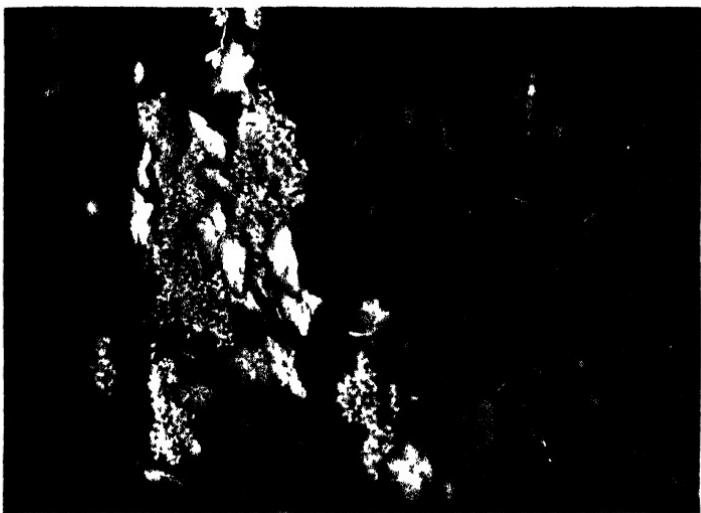


FIG. 103.—A TYPICAL HEAD OF HYDRANGEA
MACROPHYLLA F. *NORMALIS*

(See p. 388.)

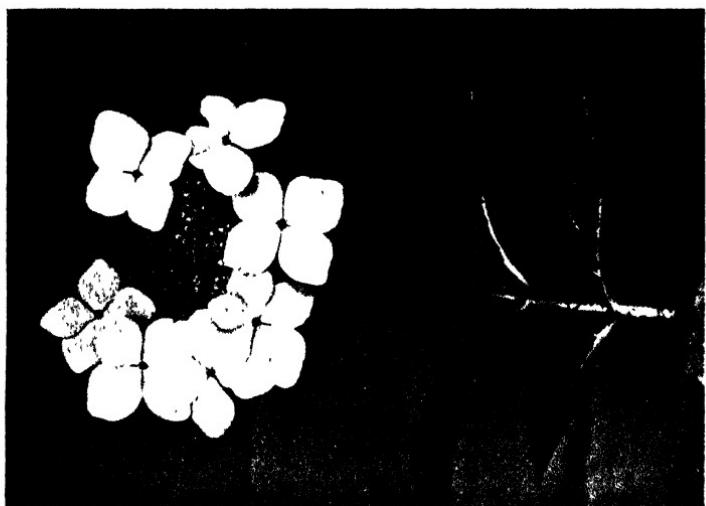


FIG. 104.—HYDRANGEA SERRATA VAR. INTERMEDIA.

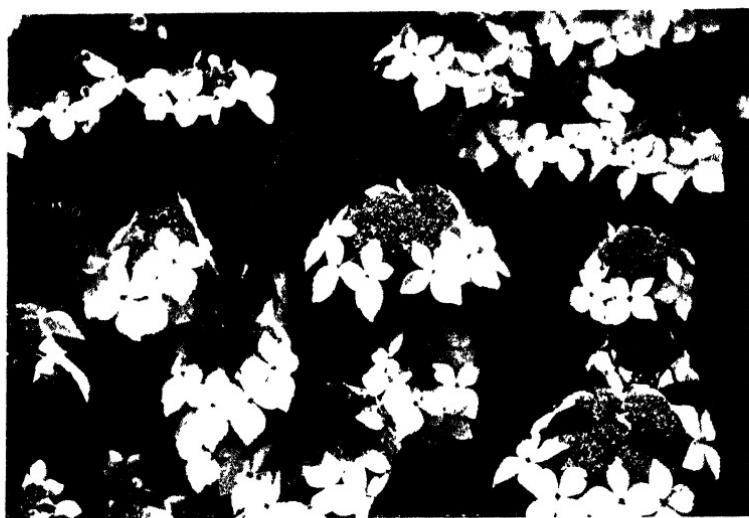


FIG. 105.—*HYDRANGEA SERRATA* VAR. GRAYSWOOD.



FIG. 106.—THE WILD FORM, *HYDRANGEA MACROPHYLLA* VAR. *NORMALIS*,
FLOWERING ABOVE THE CULTIVATED FORM, *H. MACROPHYLLA*
(See p. 388)



FIG. 107. *HYDRANGEA MACROPHYLLA* VAR. *MARIETTE*.—ONE OF THE ORIGINAL PLANTS AT KEW.

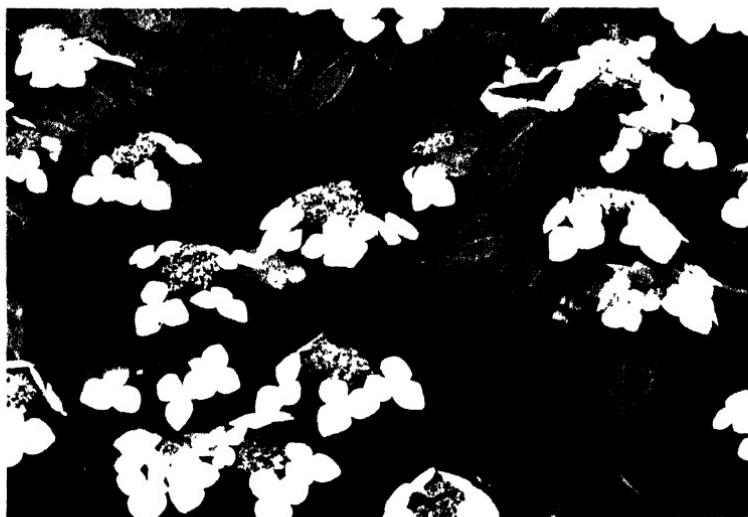


FIG. 108. *HYDRANGEA MACROPHYLLA* VAR. *MACROSEPALA*.
(See p. 388.)



FIG. 109 - *PAEONIA LEMOINEI* VAR. 'L'ESPÉRANCE.'

(See p. 398)



FIG. 110 SAMUEL GILBERT
[Reproduced from the first Edition of 'The Florist's
Vade-mecum']
(See p. 384)

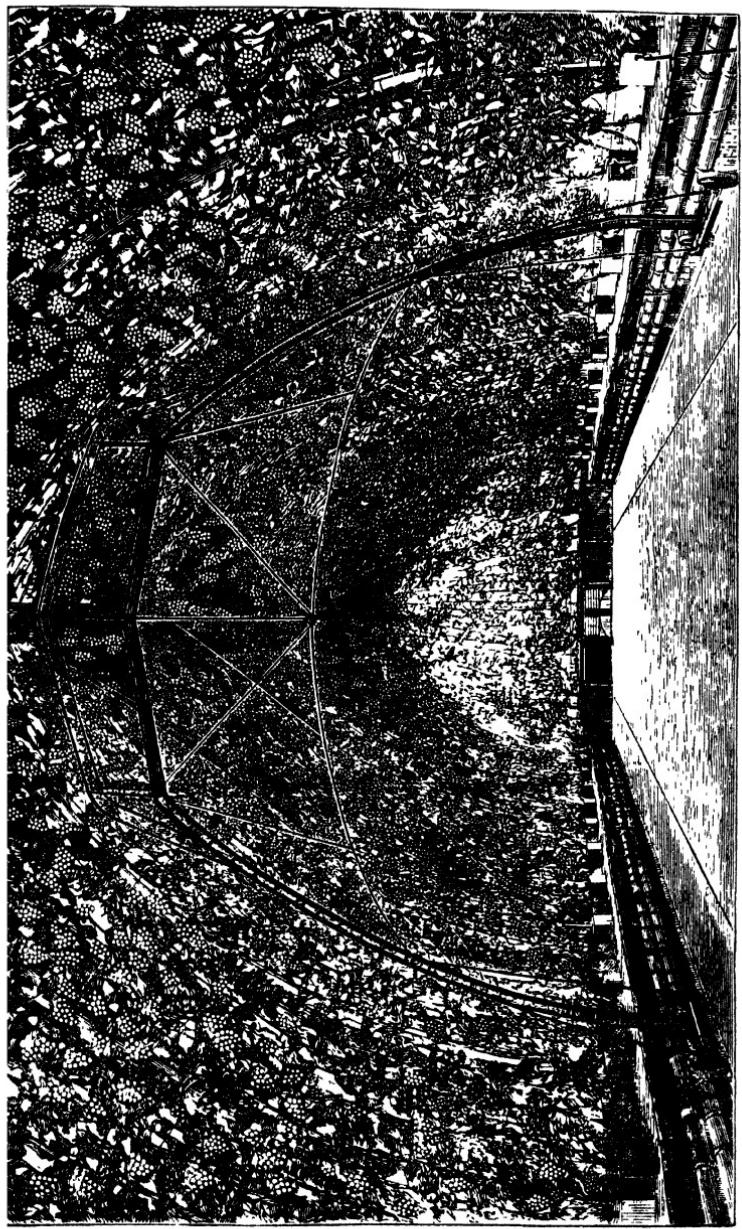


FIG. 111.—THE INTERIOR OF THE GREAT VINEYARD AT CHISWICK
(See p. 395)

To face p. 377

and, as LACAITA points out, it would be enough if we found *Girasole* used for *H. tuberosus* as the term Artichoke would have been automatically added to *Girasole* or its corrupted derivative on its arrival in London. We shall have much to say about the word *Girasole*, but it is worth recording that the combination of the two words is not to be found in any Italian dictionary or botanical work; moreover, the word *articiocco* is not used anywhere south of the Apennines where *carciofo* is used for the Cardoon. Hence the term *Girasole articiocco* could not have been derived from Rome whence *ex hypothesi* the plant came to us.

Our concern, however, is in the main with the syllogism: the Jerusalem Artichoke is a kind of Sunflower. In Italian a Sunflower is a *Girasole*, hence Jerusalem is merely a clumsy rendering of the same. The suggestion is so plausible, the transformation at the hands of the dealers and hawkers from *Girasole* to Jerusalem would have been so easy that one cannot be surprised at its ready acceptance. It will be my task to test these propositions, making the proviso, however, that we are, strictly, only interested in such evidence in their support as is related to the period 1600-1622.

As we have already dealt with the land of origin and the centres of distribution in Europe of *H. tuberosus*, our next task is to discover what the word "Girasole" in Italian stands for, and what did the Italians call the Sunflower in the early days of the seventeenth century. As far as possible the evidence will be reviewed in chronological order: we must bear in mind, however, that the Sunflower did not reach Europe till about 1586.

We may start with a note on some lines in DANTE's Purgatorio, Canto XIX, l. 10, which have been translated by BINYON (1938) as follows:

I gazed on her and as the sun's good heat
 Comforteth cold limbs weighed down by the night
 So did my look make her tongue nimblyfeat.
 And straightened her and set her all upright,
 In short time and her ruined countenance made
 With the colour which is love's delight.

In the Commentary L'Ottimo commento della divina Commedia, supposed by some to have been written by ANDREA LANCIA and in any case by a contemporary of DANTE, it is said of the above "in poetic form he wishes to show how, as the leaves of grass are smitten down by the chill of the night, reviving and following the motion of the sun just as does the *Girasole*, so his glance followed every movement of this woman." (Translated from the edition printed by NICCOLO CAPURRO, 1827-9, 3 vols., Vol. II, p. 340.) From this we see that *Girasole* was in use before the Sunflower had been heard of in the Old World, and that the behaviour of a grass is compared to it. This tends to confirm one of the commoner meanings of the word, to which reference will be made later.

In 1447 or 1448 LOUIS GONZAGA, Marquis of Mantua, caused PISANELLO to strike a medal: on the obverse is a portrait head of

LOUIS; on the reverse an equestrian figure to the left of which is a sun effulgent with rays; on the right a flower on a stalk (fig. 100). This flower is clearly an Aster. With the help of my friend Mr. DANIEL DE MESQUITA, I have attempted to find out what this family badge was called in contemporary literature, but so far we have only culled the following. CARLO PADIGLIONE published in 1864, at Naples, a pamphlet on the badges of the illustrious members of the House of Gonzaga in which he says that LOUIS' grandson the Bishop and Cardinal SIGISMONDO GONZAGA used (as a badge) the sun which looks at a plant and bears the motto "Sic vivo"—Thus I live.

In HEISS' great work on *Les Medailleurs de la Renaissance*, 1881, this flower is called a "turnesol," which, of course, is the equivalent of Girasole, and in G. F. HILL'S *A Corpus of Italian Medals of the Renaissance before Cellini*, 1930, the same flower is termed a Sunflower, which it neither is nor could have been so called at that date.

Again speaking of CARLO GONSAGA, 1551-1614, PADIGLIONE says that "a branch of the family the Marchese de Vescovado used (as a badge) a flower unknown to modern people because it has never been mentioned by the older writers; it was called 'dulipante'; it turned towards the sun, with the motto: 'Without your rays I am lost.'"

In 1629 CHARLES, Duke of Gonzaga-Nevers, during the great siege of Mantua, issued a coin of 160 scudi, on the reverse of which to the left is an effulgent sun and to the right centre a tall plant with a single terminal flower which is undoubtedly a true Sunflower (fig. 101). Presumably this is a variant of the family badge in which the Aster (or is it the dulipante?) is replaced by the true Sunflower.

In the new Italian Encyclopædia the coin itself is called a *girasole*, but it is stated that it also was spoken of as *talleri fiore*—the flower thaler. Whether either of these terms is contemporary we are, unfortunately, not told. It is probable that it is the latter which is the earlier because the thaler is a very old designation for a coin, while the use of *Girasole* for a Sunflower could, if at all, have been but recent.

The word *Girasol* is used by PHILIP SIDNEY in his *Arcadia*, and is to be found in the 1598 edition on p. 91:—

"With gazing eyes he looks, short sighs unsettled feet
He stood, but turned as *Girasol* to sun
His fancies slite did her in halfe way meet
His soul did fly as she was seen to run."

The reference to *Girasole* is in virtue of the myth that certain plants followed the sun from east to west as it traversed the heavens. While one cannot deny that SIDNEY may have had *H. annuus* in mind, it must be said that such was unlikely for that plant had only been very recently introduced into Europe and was not, as far as can be ascertained, known by that name in any country. On the other hand, the word *Girasole* was employed in France as a term for the fiery opal, and in Italy also stood for some kind of grass, as well as for the wild Chicory and the Castor-oil plant. To a man of SIDNEY'S wide culture all this would be well known.

Indeed the word Girasole was in use long before our critical period, and still is—as a name for the opal and kindred stones. The belief current in the Middle Ages being that these stones absorbed the sun's rays and, when turned from the sun, discharged once more the fiery rays they had absorbed.

Before proceeding further it is advisable to consider briefly the meanings which were attached by the savants of the sixteenth and seventeenth centuries to such terms as *Heliotropum*, *Helianthemum*, *Helenium*, *Flos Solis*, *Chrysanthemum* and *Aster*. Of all these terms that of *Heliotropum* is not only the most frequently employed, but the one which concerns us most.

The most constant and the oldest of its meanings was that of the opal; botanically it was used for a variety of plants. WILLIAM TURNER in his *Herbal* of 1548 uses *Heliotrope* as an equivalent for *Scorpiuros*, which stand both for a *Borage* and certain *Leguminosae*, and in the 1551 edition includes under it the "sonne-flower." This of course was not our *Helianthus annuus*, which had not yet reached Europe, but was the *Cistus*. Indeed most of the terms indicative of a turning to or with the sun referred at one time or another to the *Cistus*. TURNER, however, is insistent that the *Heliotropum* is not a Marigold. PARKINSON, 1629, uses *Heliotropum Indicus tuberosus* for the Jerusalem Artichoke.

ROBERT TURNER in his *Botanologia* of 1664, speaking of the Jerusalem Artichoke from Canada, mentions the *Yemala Artichoke*, which I have not succeeded in further identifying, and calls it *Heliotropum Indicum tuberosum*.

SALMON, in his *herbal* of 1710, uses *Heliotropum* as the equivalent of *Turnsole*, and his *Turnsole*, again, covers a variety of plants, in particular the *Scorpiodes* and *Verrucaria*, the wart wort, one of the *Euphorbiaceae*. He also employs it for *H. tuberosus* (Jerusalem Artichoke) in the form *Heliotropum Indicum tuberosum* or *Flos Solis Farnenanious*. *Helianthus* is generally used for the *Cistus* (see GERARD).

Flos solis, or sunne flower, may be almost anything; but in particular refers to the *Inula* or *Elecampone*, which, however, was also known as *Helenium* (DODOENS, 1553).

Chrysanthemum is another general term sometimes used as a synonym of *Aster* and by GERARD (1596) for the Marigold (*Calendula*). It was one of the terms more commonly employed to designate *H. annuus*.

A fuller discussion of the meanings attached to these various terms throughout the last 2,000 years is to be found in the essay of Sir DAVID PRAIN already referred to.

From the above it is apparent that none of these terms, and least of all that of *Heliotropum*, the graecized form of *Girasole*, was, during the period under discussion, used in any strictly specific sense.

The word *Girasole*, which has been generally supposed to be the original from which "Jerusalem" was etymologically derived, has, like the preceding terms, several meanings.

In the following paragraph is a list of such derived from Italian and other Vocabularies and Dictionaries.

- | | |
|---|---|
| 1543 Acharisio, Alberto.
Vocabolario | No mention of Girasole. |
| 1556 Venuti, Fillipo.
Ditionario Generale
Volgare et Latino | Girasole = "Kind of grass, in some places Chicory." |
| 1591 Florio, John.
Second Frutes | No mention of Girasole. |
| 1598 Florio, John.
A Worlde of Wordes | Girasole = "An herbe called in Latin Ricinus (Castor-oil plant) or Croton, also as Heliotropia, also changeable taffeties, some take it for fine leaved grasse." |
| 1603 Canal, Pierre.
Ditionario Fran ^{cois} et Italien | No mention of Battata, Pattata, Turnsol, Topinambour or Girasole. |
| 1605 Galesini, Pietro.
Ditionario—della Lingua Vulgar Latina. | No mention of Girasole, Flos Solis or Heliotropum. |
| 1611 Florio, John.
Queen Anna's New World of Words. | Girasole = "The turnesol or Sun flower as Heliotropia, also kind of precious stone called Heliotropium; some have taken it for a fine leaved grasse, also used for changeable taffeties." |
| 1623 Vocabolario della Crusca. | Girasole = "Well known plant called so because it always turns its flower towards the eye of the sun. Latin Heliotropium." |
| 1644 Venuti.
Ditionario Italiano Francese. | Girasole = "Herbe du Soleil"
Heliotropia = "Herbe du Soleil." |
| 1659 Torriano, Gio.
Vocabolario Italiano-Inglese. | ("Herbe" is used for grasses and small plants and hence most improbably for those of such great size as the Sunflower and Jerusalem Artichoke.) |
| 1688 Do. | Girasole = "The turnasol or Sun flower, some take it for the Bud or Marigold, others for fine leaved grass—also a kind of precious stone much like an opal called Heliotropum." |
| 1729 Vocabolario degli Academici della Crusca | Do.
Girasole = A plant from Peru (<i>i.e.</i> the Sunflower, <i>H. annuus</i>). |

1735	Univers Lexicon.	Girasole = "A noble stone of opal character which receives its light from the sun and retains the same some time, and which ever way you turn it, it shines so that it appears as if the sun is turning with it." No other meaning is given.
1765	Encyclopaedia Dictionnaire (Diderot)	No mention of Girasole but describes the Jerusalem Artichoke as <i>Helianthus tuberosum esculentum</i> .
1860	Barrett's Dictionary English-Italian Italian-English	Sunflower = Girasole. Girasole = Sunflower, turnesol, white or bluish opal.
1922	Dictionary of English and Italian Languages	Jerusalem Artichoke = tartufo bianco.
1925	Hoare, Alfred. English-Italian	Sunflower = Girasole Jerusalem Artichoke = topinambour, tartufo bianco.
1929	Tommaseo, Nicolo. Dizionario della Lingua Italiana-Turino	Girasole = Helianthus from Peru..
1931	Lysle, A. de R. Nuovo Dizionario	Girasole del Canada = Helianthus tuberosa.
1933	Encyclopaedia Italiana	Girasole = tournesol, sunflower. Girasole = Helianthus annuus [Neither Jerusalem Artichoke nor <i>Helianthus tuberosus</i> mentioned.] Girasole = a coin of Mantua 1629.

The evidence culled from the Italian dictionaries covers a period of 300 years as to the use of the word Girasole, as well as some of those terms referred to previously. From them we learn that in two works published between 1543 and 1598 the word Girasole does not occur at all. In the dictionaries of 1598, 1611, 1623, 1659, and 1688 Girasole does occur but is not used for *H. annuus*. It is not till 1729 that we get the first definite rendering of Girasole as the Sunflower, *H. annuus*.

If we may assume, as I think we must, that a country's dictionaries and vocabularies represent the current usage and speech of the people of the day, then we must say that the word Girasole was not used to describe *H. annuus* during a period which extended some 50 years before and 100 years after the critical period, viz. 1600-1620, under consideration.

Before, however, we leave this part of our problem, it will be of interest to note what the botanical specialists of the time, who knew and described *H. annuus*, called it, and what they meant by the word Girasole. LYTE, in his translation of DODOENS' Historia published in 1588, described the true Sunflower and called it The Indian Sunne or Golden Flowre of Perrowe—an alternative name is given, *Chrysanthemum Peruvianum*, but no mention is made of the word Girasole.

GERARD, in the 1597 edition, also describes the Sunflower very fully and calls it *Flos solis*, *Sol Indianus* and *Corona solis*, but makes no mention of Girasole.

COLONNA, as we have seen, describes in 1611 *H. tuberosus* as *Aster Peruano* *tuberous*, and hence we may assume that to him *H. annuus* was *Aster Peruano*; he does not mention the word Girasole.

ALDINI, the Keeper of the Farnese Garden, who wrote an account of it in 1625, describes *H. tuberosus* as *Solis Flore tuberoso*, and hence one may assume he would describe the Sunflower proper as *Solis Flore*. To him Girasole is an alternative name for *Ricinus Americanus*.

In the 1644 edition of DODOENS' *Cruydt-Boeck* the editor describes *H. annuus* under the name of *Chrysanthemum Peruanium* and says in English it is the Indian Sunflower or *Flos Solis* and in Italian it is known as *Pianta massima*, whilst the *H. tuberosus* is called *Chrysanthemum Canadense* or *Herba solis tuberosa radice*.

In fact we can find no botanical writer who uses the word Girasole for *H. annuus* until 1666, when AMBROSINI in his *Phytologia*, p. 287, describes it under no fewer than ten different names in Latin and adds "Italis, Girasole." Immediately following comes a description of *H. tuberosus*: this enjoys nine different Latin names, but significantly no colloquial name in any language is added. This would seem to be strong evidence that *H. tuberosus* was not in common use, nor as well known as the Sunflower itself.

One cannot close this part of the argument without some reference to the views of DE CANDOLLE and SCHLECHTENDAL. The former in his *Origin of Cultivated Plants* (1883) is confident of its North American origin and notes that there are no species of *Helianthus* in Brazil. As regards the names, he seems not to be aware of the facts about the Topinambour and derives the name from some real or supposed Indian name [of North America]. "Jerusalem," he states, is a corruption of "Girasole," the Sunflower.

SCHLECHTENDAL devoted an article in the *Botanische Zeitung* of 1858 to the history of *Helianthus tuberosus*. He supports the views of DE CANDOLLE and reinforces his arguments for its North American origin. He gives a valuable survey of the literature but offers no satisfactory explanation of the origin of either of its aliases Topinambour or Jerusalem, accepting for the latter without argument the derivation from Girasole.

Summing up this part of the discussion it may be said that there appears to be no evidence, whether sought among specialist botanical sources or from the common language of the day, that the word Girasole was used during the period under discussion in Italy or elsewhere either for our Sunflower, *H. annuus*, or for the Jerusalem Artichoke *H. tuberosus*.

If, then, the prefix "Jerusalem" is not to be derived from Girasole, whence does it come?

The suggestion I am about to put forward I owe to my friend Sir DAVID PRAIN. In his opinion the use of the prefix "Jerusalem" came about in the following manner:

Pastor PETRUS HONDIUS, as we have seen, grew the root at Ter Neusen. We know that he gave specimens of it to his friends abroad, and that before long the tubers began to be spoken of as products of Ter Neusen; this we learn from RAVELINGEN's edition of DODOENS' Cruydt-Boeck (1618), where he speaks of Artischokappeln van Ter Neusen; LAURENBERG does the same in his Apparatus Planterum Primus, 1632. Further, we have shown that by 1622 the root was sufficiently well known and widely distributed in this country to be included as one of the foods whose dietetic value excited the serious attention of Dr. VENNER. PRAIN assumes that imports of the tuber reached London some few years before from Ter Neusen by the regular service of the Dutch barges which sailed up to the Custom House Wharf. Here they would be bought by the hawkers of the town, who, after an initial effort to cry their wares as Artichokes van Ter Neusen, quickly metamorphosed it into Artichokes of Jerusalem—Jerusalem Artichokes.

I realize that at first this suggestion does not impel conviction, but one is apt to forget that in the early seventeenth century "Jerusalem" was a word far better attuned to the minds and lips of the man in the street than it is to-day; indeed it probably meant more and was a far more familiar word in their mouths than would be even "Paris," and how much more so than Ter Neusen! The Bible had long since supplied the intimate furnishing of the consciousness of all, and not least that of the man in the street. In this connection one may recall the fact that the word "Jericho" as a colloquialism was in use before 1648 for an out-of-the-way place.

It may be urged against PRAIN's suggestion that it lacks direct documentary evidence, but so does the Girasole hypothesis. On the other hand, we do know that in Holland the familiar name for the root in 1616, *i.e.*, within our critical period, was Artichokes of Ter Neusen, whilst the word Girasole was not used in this connection for 200 years either here or apparently anywhere else. Finally, it may be said that the conversion in the vernacular of Girasole to Jerusalem is easier and more natural than that of Ter Neusen: perhaps so, but should one not always be on one's guard against the facile in matters etymological?

One may perhaps be allowed to add a final word to this "comedy of errors." It is not generally known that *H. tuberosus* is one of the few food plants which possessed a really good name—a name to which it has an inalienable right. The native name in Virginia was Kaischuc penaук. TRUMBALL, an authority on North American languages, in a conjoint paper with ASA GRAY in the American Journal of Science, 1877, assures us that the meaning of these two words is "sun" and "roots." Sun-root would have been a most suitable name; indeed that well-known gardener, ROBINSON of Gravetye, in his Gardening Illustrated, advocates that this should be used in preference to all others—but it was too late. The familiar names Topinambour and Jerusalem Artichoke will assuredly be with us to the end, perpetual witnesses of that incurable illogicality which does so much to lighten the common drab of man's life here below.

IN THE LINDLEY LIBRARY.—IV.

SAMUEL GILBERT AND HIS FLORIST'S VADE-MECUM.

By FRED STOKER, F.L.S., V.M.H.

A MAN, so we are told, is known by his works ; but if this is true, then many an author has portrayed himself less clearly than SAMUEL GILBERT (see fig. 110), rector of Quatt, in his *Florist's Vade-mecum*.*

GILBERT appears to have been fairly typical of the country clergyman of the late seventeenth century ; assertive, dogmatic, apt to

“ Compound for sins he was inclined to
By damning those he had no mind to,”

interested in anything rather than his own profession, yet, at the same time, sincere and honest according to his lights. He gives no indication of the clerical side of his life, but, on the other hand, styles himself on his title pages “ florist ” and “ Phileremus,” the latter description presumably denoting his love of peace and solitude. As a business man he was shrewd and a thorn in the flesh of swindlers. More than that, he is careful to tell his readers how these gentry may be detected and overthrown. Nor does he delay his admonitions ; in the introduction to the *Vade-mecum* we find this passage : “ in publishing what my own Experience hath found out, to the Advantage of the Subject now treated on, and its true Lovers, though to the Disadvantage of the Mercenary Flower Catchers about London, or some that are of the same Stamp scatter'd up and down the Country, fathering new Names on old Flowers to enhance their price ; and if a Plant of Value, and a Rarity, though you pay dear for it, unless you receive it in Flower, you shall to your Cost and Disappointment experience their Unfaithfulness.”

It is as a florist that, as SAM WELLER would put it, GILBERT “ comes out strong.” Florists' plants and everything connected with them were the things that mattered to him. A stickler for method, he gives as a kind of prologue to his book a list of “ The necessary Tools and Instruments for Gardening.” The most of these are very practical, but two of them show a certain liking for highly specialized and, to anyone else, frivolous implements. “ A Rake with a broad Head, without Teeth, for smoothing the Earth in a Bed,” for example, scarcely qualifies as a necessary tool, and as for his No. 3 watering-pot — an instrument “ with a small Neck, the bottom full of Holes,” from which the outflow of water was regulated by thumb.

* A duodecimo volume which ran to three editions. A copy of the rare first issue, published in 1683, is in the library of Mr. T. HAY and provides the portrait herein reproduced. The third edition, published in 1702, is that from which this account is taken.

pressure over the "neck" — it is more than doubtful whether even a seventeenth-century gardener would use it had he one of more usual pattern at hand as, in fact, GILBERT had.

The first chapter is given to garden planning, soil treatment and the selection and use of manures. Sawdust is recommended to improve clay soils, but it must be "Sawdust after it hath lain in a moist place till rotten, having its Sharpness abated, hath the nature of Rotten Wood or Wood Pile Dust, but the chiefest is rotten Willow, or Willow Earth, to make a light Soil for fibrous rooted flowers, and chiefly for Auriculas." It is impossible to say when sawdust was first used in gardening, but its modern advocates may find support from the view held by GILBERT two hundred and fifty years ago.

The main part of the book is arranged on the Flowers-Month-by-Month plan. Under the flowers of March the author places "*Primula veris*, Primrose, viz. the double pale Yellow, a pretty flower, though too common. . . ." It is hard to think that the Double Yellow Primrose was so very common at the close of the seventeenth century, but, apart from that, the passage reveals how the old-time florists were as much enslaved by the novel as are their successors at the present day. On the then existence of the Double Red Primrose he casts more than a doubt. "I have only heard the name," he confesses, "but think there is no such thing: as supposing [it to be the same as] some last Winter bestowed on me by a great lover of Rarities in this kind (Mr. JOHN WOOD of Shrewsbury) the root bearing many Flowers very double, seldom blowing out well, and the Colour but of a dull Horse-Flesh hue. . . ." It appears from this, incidentally, that Master GILBERT not only looked a gift horse in the mouth but publicly announced the condition of its teeth and the name of its donor. As, however, he was a man who understood the word red to mean red and not a washy pink, magenta nor anything but red, and probably had in mind a plant like the later 'Madame de Pompadour,' he may be excused for the unequivocal expression of his disappointment.

As might be expected, considerable space is given to the most popular florists' flowers of the time, such as Auriculas, Tulips, Ranunculus, Roses and Carnations, the last being termed "July Flowers" by GILBERT "from the month they blow in" and "the nobler sorts Dutch-July Flowers or more vulgarly Carnations."

His contribution to the literature of the Auricula is after the contemporary fashion and makes price the criterion of merit. Exact instructions are given on harvesting the seed, the best method of sowing it ("not till now made Publick"), raising seedlings and the cultivation of mature plants. Well rotted Neat's dung, Flood-sand or Brook-sand and Willow Earth mixed together and sifted is recommended as the compost "they most delight in" and at least has the credit of being a bland and simple soil in comparison with others in vogue during the eighteenth century. The named Auriculas which GILBERT lists went out of cultivation long ago. Some of them, like 'Mrs. Bug's Fine Purple,' 'Mr. Rea's Purple' and 'Mrs. Austin's

Scarlet,' sound attractive, but those which GILBERT himself selected as the best were "two rare striped Auriculas, their price bespeaks them, the one at four, the other nearer five pound, and have been sold for twenty pound as I have been informed ; they may now be cheaper and are in the Hands of my truly worthy Friend, Peter Egerton, of Boughton, near Chester, Esq. viz. the double striped, Crimson and White" and "the double very large and full of Leaves, Purple and Yellow, the two choicest Rarities in Flora's Cabinet." Such they might be to GILBERT, but to the fancier of the present day Double Striped Auriculas would appear as the monstrous products of a bad dream. Still, educated taste is as changeable as manners and, for all we know, these harlequins may once again be cherished as gems unparalleled.

From the number of pages devoted to them, Tulips appear to have appealed to GILBERT more than any other flowers. He classified them as Precoces, Medias and Serotines—early, middle and late flowers—a convenient division which is still more or less observed. The varieties he names are now less than memories and his methods of cultivation long replaced by simpler ways. And it is doubtful whether the most credulous follower of the old-ways-are-best school would employ GILBERT's technique for restoring bulbs which are "rivel'd or crumbled on the outside and feel soft." He had it from his father-in-law, the celebrated florist JOHN REA, a relative of whom he was exceedingly proud, and it consisted in wrapping up an affected bulb in wool "dipt in Sallet Oyl," placing it where the warmth of a fire would just reach it and later, about the end of August, setting it in the ground in a wrapping, so to speak, of wood-fire soot and sand.

Neither GILBERT's plants nor methods can all be enumerated, but one or two of his instructions concerning Roses must not be allowed to escape us. To make the "double Yellow Rose" (*R. hemispherica* ?) bloom more generously he, prompted by REA, advises double budding. First, the "Single Yellow" (*R. foetida* ?) is budded on the Franckford Rose (*R. francofurtana*) and then the Double Yellow on the Single Yellow scion.

He deprecates the ways then employed for forcing Roses into bloom ; he does not, indeed, think the game worth the candle and has "reason to suspect the killing of trees thereby, a deserved loss for following irrational and unexperimented impositions." Retarding the blooming period is, however, a very different matter, "especially when no more pains than sheering off the buds is necessary."

GILBERT, for a clergyman, was rather too astrologically minded. He regulated his sowings, plantings, graftings and pruning by the phases of the moon and positions of the stars. "If you prune your Vines the Moon in full, and posited to Taurus, Leo, Scorpio or Sagittary," he tells us, "neither Worms nor Birds will infest your Grapes." So and so forth does he instruct to the length of a page. His star-gazing and magic were, however, innocent enough, but what extenuation can be offered for his brutal directions on how "To take a Fox

by a drag Hook " and the equally barbarous ones on the taking of a Heron, Coot or Osprey? It will suffice to quote the first : " Take a large Salt-Water Fish-Hook, bait it with Flesh and tye it by a line on a strong Bough, cover the Hook with the Bait or he'll discover the Deceit ; let it hang so high that he may leap to catch it ; let your Hook be strengthened with Wyer five Inches above it lest he bite it sunder."

Whatever esteem SAMUEL GILBERT may win as a gardener must be considerably lessened by his admitted, though apparently unconscious, cruelty.

ROSA ERNESTII.

By F. C. STERN, O.B.E., M.C., F.L.S.

THE Rose of which I am enclosing a photograph is well worth the attention of readers of the JOURNAL. It came to me under the name of *Rosa Rubus*, but its proper title is *R. Ernestii* Stapf. (See BEAN, Trees and Shrubs, Vol. III, p. 439 ; STAPF, Bot. Mag. 1938, t. 8894.)

This Rose makes a very beautiful shrub, a semi-climber throwing up long shoots, although not so vigorous as other Roses of the "multiflora" group. The leaves have usually five leaflets which are tinged with purple on the underside of the young shoots, but are quite green when older. I have followed BEAN's description in the naming of this species, although the flowers in this plant are always white, not sometimes faintly pink as BEAN suggests.

The species of this group from Western China require more examination. The Rose depicted in fig. 102 agrees with BEAN's description and also with that in REHDER's Cultivated Trees and Shrubs, 1927, p. 431, but not with LEVEILLE and VANT'S description of *R. Rubus* in Miss WILLMOTT'S book.

The name 'Ernestii' originated in STAPF'S article on *R. filipes* in the Botanical Magazine which I find difficult to follow. Wilson's Rose 4200 and Farrer's 291 are both growing in this garden and appear to me to be two different species. The plate B.M. t. 8894 is an excellent illustration of Farrer's Rose 291, but differs in many ways from *R. filipes* of REHDER & WILSON (Wilson No. 4200). *R. filipes* is a gigantic climber, growing up to the top of the house, while Farrer's Rose is only a strong bush. The inflorescence of *R. filipes* is large and loose, while the other is compact. The petiole of *R. filipes* is channelled on the upper surface, with only a few widely scattered hairs, and the pedicel is glabrous or sometimes with distant glandular hairs, while in *R. filipes* the petiole is not channelled, but prickly, and the pedicel is hairy, as can be seen in the illustration. The fruits, too, are different.

These are a few of the differences between these two plants, which seem to me to be two different species and quite separate from

R. Ernestii. They all three have leaves with usually five leaflets and white flowers.

There is yet another Farrer Rose 775, belonging to this group, which he described as "a fine ramping Rose from the hill tops of N. Szechwan in habit between *R. Banksiae* and 291." This species is more like *R. filipes* of WILSON, having the channelled petioles and nearly glabrous pedicels, but the leaflets are much smaller—only 1 inch long and $\frac{1}{2}$ inch broad compared with $2\frac{1}{2}$ inches long by $1\frac{1}{2}$ inch broad in *R. filipes*.

These Roses of Western China, which are so beautiful and so hardy, make splendid garden plants and should one day, when men have time again, be properly named and described.

This plant was introduced by WILSON in 1906.

THE GARDEN HYDRANGEAS.

By MICHAEL HAWORTH-BOOTH.

THE following notes are a short précis of a paper prepared some time ago in order to collate all the previously published data regarding these plants and their nomenclature with a view to bringing the excellent qualities of some of the less known kinds to the attention of Fellows. Under war conditions the full paper is too long for publication in the JOURNAL, and it has therefore been deposited in the Lindley Library together with the original photographs of all the varieties mentioned. Complete herbarium material has, upon request, been supplied to the Herbarium at Kew and also at Wisley.

Hydrangea macrophylla (Thunberg) De Candolle.—This, the type plant often known as *H. hortensis* or *H. opuloides*, is the common Hortensia of the terrace pot or hotel lounge. It is too well known to require description, although there are a great number of named varieties characterised by large heads of sterile flowers, in colour white or either blue or pink, depending upon soil conditions. Except in the extreme south and west the plant is little used as an outdoor shrub, as autumn frosts often cut the unripened shoots and spring frosts may damage precocious growth. These dangers can, however, be very largely obviated by careful selection of position and special cultivation. Both operations are directed to the same end, that of securing fully ripened wood, for such growth is able to withstand winter temperatures near zero without damage. To attain this result the plants should be grown in full sun but sheltered from north and east winds by a belt of low, dense evergreen.

As regards cultivation, poor soil is desirable to assist in keeping the growth short and hard, but, owing to the thirsty nature of the plant, a mulch of lawn mowings or bracken is required to retain sufficient moisture. Where lime is present in the soil the plant's metabolism

is interfered with and iron cannot be assimilated in sufficient quantity. Under these conditions the flowers are pink instead of blue. The same result generally occurs if the plant is starved in a pot or even after moving.

It is remarkable that a shrub of such outstanding beauty of flower, which is, moreover, produced in the late summer when shrub blooms are at a premium, should have been so little used for landscape effects in our gardens, even where more tender shrubs are successfully grown. Pictures of massed colour as fine as those attained by the Rhododendrons or Azaleas of early summer are obtainable whenever the conditions are reasonably good, for *H. macrophylla* is very easily propagated (fig. 106).

Hydrangea macrophylla var. *Mariesii* (Bean) E. H. Wilson ex Rehder.—This is not a species but merely one of the varieties of the above. It is similar in all respects except the form of the inflorescence. In place of the crowded corymb wholly composed of sterile flowers these latter are placed mostly around the margin, the less conspicuous fertile flowers and numerous abortive sterile flowers forming the centre of the head. The bloom is thus more informal and decorative in form. It is a most beautiful variety, but the real thing is by no means common in gardens, being often confused with various other forms (fig. 107).

Hydrangea macrophylla var. *macrosepala* (Regel) E. H. Wilson ex Rehder.—This is another form of the garden type, but there are only a few sterile flowers in the marginal ring and these are individually very large, white in colour and usually have only three petaloid sepals instead of four. It is a very handsome plant (fig. 108).

Hydrangea macrophylla var. *maculata* (Blume) E. H. Wilson ex Rehder.—A variety with variegated foliage. The marginal sterile flowers are somewhat sparse and irregular and white in colour. The fertile central ones are a clean lilac which adds to the appearance of the bloom, but it is more a plant for the collector than the landscape gardener.

Hydrangea macrophylla var. *nigra* Nicholson.—This is an ordinary Hortensia type differing only by having the stems black in colour. The flowers are pink or blue.

Hydrangea macrophylla f. *normalis* E. H. Wilson.—This magnificent shrub is evidently the original wild form of the garden Hydrangea. Its growth is much sturdier and is seldom cut by frost. In Japan WILSON reported it as a plant of the open sea coast growing fully exposed. The sterile flowers form a regular ring and are beautifully formed with attractively serrated edges and borne with great profusion (fig. 103). It is a first-class shrub worthy of being widely grown and might be tried in many places where the Hortensia types have been found just insufficiently hardy. It is noticeably later in its flowering date, seldom being at its best until August is well begun and lasting in beauty until the end of the month. Grown in the open, with shelter only from the coldest winds, as it should be, it will form a shapely rounded bush some 6 feet in height with a wide base furnished to the ground.

Hydrangea serrata (Thunberg) De Candolle.—*Hydrangea serrata* is a hardier species than *H. macrophylla*, and it is a plant of the woodland rather than the open coast. Even in a shady situation it is rarely cut by frost. The form commonly known as *H. Thunbergii*, which is identified as the type, is a small fragile plant of weakly Fuchsia-like growth with small crimson sterile flowers of three rounded petals very sparsely set around the head. But the commoner form in gardens is so different as to merit distinction as var. *intermedia* as it makes such an obvious link between the first-mentioned type and the garden varieties. It is a taller, stronger growing plant with pointed petals noticeably serrated. It is an excellent inexpensive shrub for massing on woodland verges for late summer effect (fig. 104).

Hydrangea serrata var. *Rosalba* (Van Houtte) Rehder (Man. Cult. Tr. and Shr., A.M. R.H.S., 1939).—This is merely a superior form of the above although obviously a distinct seedling clonally propagated. The flowers are larger and turn a brighter crimson (J.R.H.S., Vol. 22, Part I) after opening white. The fertile flowers are blue. The foliage is coarser, more ovate in form and commonly bullate.

Hydrangea serrata var. *Grayswood*, f. nov.—This is by far the finest of the varieties of *Hydrangea serrata* that I have so far examined. It is both a stronger growing and a more finely formed plant than the others in all its parts. Like the foregoing the flowers open white and later flush crimson, but the four petaloid sepals are unusually long and pointed and larger in size. The leaves are a matt green suffused with reddish-brown and in shape narrowly ovate, acuminate, evenly serrated and entire at the base. The average is about 11 cm. long and 4 cm. broad. They are placed opposite and in young plants tend to point upwards. An old plant will reach 5 feet in height. A more detailed description is given in my manuscript in the Lindley Library (fig. 105), and this also includes the remaining varieties of *Hydrangea serrata* which comprise:

H. serrata var. *acuminata* (Siebold & Zuccarini) Rehder.

H. serrata var. *acuminata* *sterile*, f. nov.

H. serrata *pubescens* (Franchet & Savater) Rehder.

H. serrata var. *Wizzenboss*, f. nov.

H. serrata var. *stellata* (Siebold & Zuccarini) E. H. Wilson.

CHISWICK GARDENS.

By CHARLES H. CURTIS, F.L.S., V.M.H.

THE Horticultural Society of London—subsequently the Royal Horticultural Society—was founded in 1804 at a meeting convened by JOSIAH WEDGWOOD and held in Piccadilly on March 7. About a year later, THOMAS ANDREW KNIGHT (President in 1811) addressed a meeting of the Society, and after expressing his views of what the Society could and should do, concluded by stating that “The establishment of a National Society for the improvement of Horticulture has, therefore, long been wanted ; and if such an Institution meet with a degree of support proportionate to the importance of its object ; if it proceed with cautious circumspection to publish well ascertained facts only, to detect the errors of ignorance, and to expose the misrepresentations of fraud ; the advantages which the public may ultimately derive from the establishment will probably exceed the most sanguine hopes of its founders.”

His words were prophetic. The Society prospered so greatly that an Experimental Garden was established at Kensington, a nursery created at Ealing and a house purchased in Regent Street for £4,200, in which the Society's business was conducted, including regular meetings and modest exhibitions, for forty years. Fortune was ever fickle, and later, after the expenditure of very large sums of money on exhibition buildings, an elaborate lay out, statuary and fountains, depression inevitably followed, and the outlook was anything but promising. Fortunately, on March 21, 1822, the Society obtained from the DUKE OF DEVONSHIRE a lease of thirty-three acres of land at Chiswick, at a rental of £300 a year, with power of renewal for ever upon a fine of £450 every thirty years. This power of renewal was never exercised. So soon as the Society took possession of the Chiswick site it “cut its losses” and gave up the gardens at Kensington and Ealing. Chiswick lies along the north bank of the Thames between Hammersmith and Brentford, and is now joined with the latter into one Borough.

In the year 1823 no fewer than twelve hundred varieties of Roses were cultivated at Chiswick, and during 1830–55 nearly £11,000 was spent there on works of permanent utility ; more than £7,000 was expended on the introduction of rare plants and seeds ; while the upkeep of the Gardens during the same period, together with pecuniary awards and medals “for meritorious productions,” cost £19,224. ROBERT FORTUNE, who had been hothouse foreman at Chiswick, was sent to China in 1842 to collect rare plants ; among others he was successful in introducing *Wistaria sinensis* and the first living plant of the species ever seen in England grew at Chiswick. Great

exhibitions were held in the Gardens and the profit therefrom sustained the Society over a long period.

In mid-Victorian times, when royalty, nobility and gentry congregated at the many fashionable functions then held, as it gave them an opportunity to display rich dresses, fine horses and expensive vehicles, they paraded, but probably only a comparatively few took a keen interest in these functions. There were, however, those who did not go simply to see and be seen ; these were the wealthy patrons of the arts or sciences. But there were others whose interest lay deeper still. They loved, studied and assisted some particular art or science. Horticulture made a strong, spectacular appeal to the fashionable people of the times ; it also attracted and held the interest of scientists, owners of noble estates and lovers of gardens and gardening. The Horticultural Society's Gardens at Kensington could always attract plenty of people, but later on, it was to the Gardens at Chiswick that enormous crowds went on those occasions when a special exhibition was in progress. Whatever their personal reasons, the fashionable folk of London "did" Chiswick, as, in later times, they "do" Chelsea Show.

Chiswick Gardens attracted horticulturists from all countries ; they were the great centre of horticultural activity both for Britain and the Continent. Weary heads that carried crowns insecurely found a peaceful pleasure in visiting Chiswick ; nurserymen came to inspect the various trials of fruits and flowers ; famous amateur gardeners brought their gifts of rare plants and secured others to swell their own collections. Chiswick, however, was not then so easily reached as now ; the wealthy folk went in carriage and pair, complete with footmen ; but gardeners, that is professional gardeners, could not attend in large numbers because of the difficulty and expense of travelling.

A journalist of those days wrote : "The exhibitions in the Garden of the Horticultural Society are concluded for the year (1841) ; and we are able to congratulate the Fellows of the Society upon the unprecedented success that has attended them. Twenty-two thousand one hundred and ninety-three tickets have been issued, nearly the same number of persons visited the garden, and 285 gold and silver medals, amounting to £744 13s. have been awarded to successful competitors, who have also had the satisfaction of knowing that their skill has been appreciated by the highest nobility of this land, and by the many foreign visitors who will carry away to distant countries of the East and of the West the fame of English gardeners. Turks, Persians and Hindoos, Greeks, Italians, Spaniards, French and Germans, men from the wilds of North America, and the remote shores of the Pacific, have witnessed these wondrous displays of skill and have been compelled to recognise the pre-eminence of England in the peaceful arts of domestic life."

A fair idea of the importance of the old Chiswick Gardens may be gathered from a report made by a member of the staff of the Gardeners'

Chronicle who visited Chiswick in 1841, and stated that " In addition to the work in the orchard, alterations and improvements are being skilfully carried out in the Arboretum, under the direction of Mr. GLENDENNING. A new gravel walk fifteen feet wide has been formed from the principal entrance in the Duke of Devonshire's road up to the iron tent, where it ends in a circle surrounded by raised beds ; and out of the same circle another walk, of similar width, leads up to the end of the large conservatory. The exhibition tents are to be placed on either side of this latter walk, to which the iron tent stood obliquely ; and in order to obviate the incongruity which this would have occasioned in the new arrangement, the latter has been removed and placed parallel with it, so as to range with the other tents. An entrance gate from, and an egress gate to, the Duke of Devonshire's road have also been made immediately opposite the ends and in a line with the tents, by which means the latter can easily be entered in wet weather. The strip of flower-garden which lies between the iron tent and the ' Duke's entrance ' is likewise being entirely remodelled. As has been stated, the Holly hedge which divided it from the Arboretum has been removed ; the shrubbery has been set back to the boundary fence ; the ground in front is being levelled for Grass, in which flower beds will be disposed along the side of the new walks, intermixed here and there with rare Conifers, Standard Roses, and other ornamental shrubs, and altogether this will soon be one of the most interesting parts of the garden."

Perusal of the Transactions of the Horticultural Society of London reveals the fact that very many plants, especially Orchids and other greenhouse subjects, first flowered under cultivation at Chiswick. The Orchid collection must have been a fine one and no doubt the DUKE OF DEVONSHIRE—a generous patron—presented specimens sent home by his collector GIBSON while PAXTON was gardener at Chatsworth. That the collection contained magnificent specimens, all indicating high cultural skill, is shown by the following report made in 1850 :

" Three remarkable plants are now in flower in the Horticultural Society's Garden. The following are the particulars of their dimensions :

" *Laelia superbiens* has 9 flower stems upwards of 6 feet long, with clusters of flowers varying from 8 to 14 each ; the total number of flowers on the 9 stems is 90 ; the plant measures upwards of 6 feet across.

" *Dendrobium speciosum* has 18 flower-spikes, from 18 to 20 inches in length and with 80 to 100 flowers on each ; the plant measures nearly 6 feet across, with leaves from 9 to 12 inches long and 3 inches broad.

" *Phalaenopsis amabilis* has upwards of 40 of its large, white flowers now expanded.

" It is superfluous to add that these are plants which have been many years in the Society's possession. The first plants were, in fact, gigantic specimens when imported."

Chiswick and Turnham Green witnessed some extraordinary sights

in those far-off days. There is a story to the effect that a tremendous thunderstorm broke over the gardens on the occasion of a certain function to which all London—fashionable London—had come. Before the carriages could be brought to the entrance many a high-born lady was drenched to the skin ; some lost their dainty footwear while endeavouring to reach shelter. Others flung their wet and muddy stockings from the carriage windows. Early the following morning, after the tents had collapsed and the viands had been spoilt, those whose duty it was to clean up Turnham Green had unexpected luck, and for weeks afterwards—so the story goes—the wives of labouring men proudly displayed the cleansed shoes and stockings discarded by their wealthier sisters.

The original Chiswick Gardens included an Arboretum, Orchard, Show Grounds, Flower Beds, Shrubberies and Trial Plots. The land became valuable and surrounding areas were “developed,” roads made and houses built. But the Society lost both ground and prestige and the Chiswick Gardens I knew were only a shadow—a substantial shadow, however, rather less than ten acres—of those that won international fame. Nevertheless, under the Superintendence of Mr. ARCHIBALD F. BARRON they continued to function, fine exhibitions were held there and Conferences attracted those who really mattered.

There came a day when the Royal Horticultural Society advertised for an Assistant to the Superintendent. Among a hundred and more applicants there were two Kew men. Both got into the short list and were interviewed by the Council, over which the late Baron Sir HENRY SCHRÖDER presided on that occasion. The Kewites were the final pair, Mr. THOMAS HUMPHREYS and myself. I was appointed, and in due course was succeeded by my friend, who, later, became Curator of the Birmingham Botanic Garden at Edgbaston.

The Chiswick staff included Mr. TURNER, who was general foreman, and afterwards became Superintendent of the Royal Hospital Gardens, Chelsea ; and Mr. WAUGH, who was fruit foreman ; these were housed respectably, but the students who came from distant homes had to be content with tiny, single-roomed bothies ranged behind one of the vineeries. These hovels—no less—were a disgrace to the Society, but the Society was only then emerging from a long and unhappy period, deserted by fashionable folk and short of funds. Students must have been a hardy race to endure such bothies. Did JOSEPH PAXTON “pig” in one of them ? Probably ; and that may be the reason why he built himself such a magnificent house on the Chatsworth estate ! Dear old JOHN FRASER certainly did, and he told me that the door of his den would not shut properly, and in severely cold weather his trousers were often frozen so stiff that they would stand upright without assistance !

Dr. (afterwards Sir) DANIEL MORRIS, the Assistant Director of Kew, was then Treasurer. His wise counsel, together with the enthusiasm of the Rev. W. WILKS, Secretary, and the very high horticultural status of Sir TREVOR LAWRENCE, President, gradually drew the Society from its long slough of despond.

The entrance to the Chiswick Gardens as I knew them was a modest conservatory-like structure near the end of Sutton Court Road, close to Turnham Green. It was the kind of entrance that graced many a well-kept nursery, but in such instances it was a show house for the display of seasonal flowering plants—an advertisement as well as an entrance. Undignified, it was eloquent of departed glory—no sort of entrance where royalty could receive a royal welcome.

The Council Room at Chiswick was an unpretentious Ivy-clad, one-roomed structure, containing a large board-room table and sufficient chairs to accommodate the Council or the various Committees. The chairs were hard and solid. The Council Room served as an office for Mr. BARRON and myself ; it was a dark and cheerless place. A few bookshelves occupied the space on either side of the big fireplace and these held numerous copies of the Botanical Magazine and of the earlier R.H.S. JOURNALS, a few catalogues, files of bills and the Trial Record books. No care was taken of the Botanical Magazine, indeed I doubt whether anyone besides myself looked at the volumes while I was at Chiswick ; had I been so minded, my own bookshelf could have been greatly enriched and no one else the wiser !

Moderately good shrubbery borders, backed by Yew hedges and fronted by lawns and flower beds, flanked the Broad Walk, which, fairly obviously, had been a very important feature in spacious and dignified times. Memories extending back half a century are inclined to become blurred, but I was a regular visitor to Chiswick until the R.H.S. moved to Wisley, and am sure these borders were well stocked with the best subjects then available. It was there I first saw *Paulownia imperialis* in flower ; fine examples of varieties of *Hibiscus syriacus* graced a sunny spot, and *Deutzia crenata flore pleno* flowered profusely. Rhododendrons and Azaleas were conspicuous by their absence.

The Broad Walk led from Sutton Court Road to the Great Vinery—the most conspicuous and most important structure in the Gardens.

Although built as the central, dome-like feature of a grandiose conservatory, projected but never completed, the Great Vinery was 180 feet long, 30 feet wide and 26 feet high. A curvilinear, span-roofed structure, it cost £4,500 to build, but the tax on glass made a very considerable item in this sum. Used as a plant house for a long period, on the proposal of Mr. G. McEWEN, then Superintendent, it was converted into a vinery in 1857, and a very fine collection of Grape varieties was planted after both inside and outside borders had been made (see fig. III). The vines, planted along the sides, in pairs of one variety, were grown on the single-rod principle and nearly all of them reached the top ! This famous collection provided Mr. A. F. BARRON with material for the descriptions and practice found in his Vines and Vine Culture. In such a mixed collection not all the varieties behaved equally well, but I remember that 'Canon Hall' and 'Muscat of Alexandria' cropped freely, while 'Barbarossa,' 'Trebiano' and 'Syrian' produced massive bunches year after year.

'White Tokay' was another Grape that bore heavy clusters. 'Black Monukka' always attracted me as it carried large clusters of small, curiously-shaped, seedless, reddish-black berries. These were of excellent flavour, but the variety could not achieve popularity in face of the demand for large-berried Grapes. Dr. ROBERT HOGG, who took full advantage of the fruit collections at Chiswick, tells us in his Fruit Manual that 'Black Monukka' was cultivated at Hampton Court and thence found its way to Chiswick.

Grape thinning is a tedious job under any conditions, but at Chiswick it was a wholesale business in the Great Vinery. To enable the men to reach the bunches an iron, ladder-like arrangement was provided, built to coincide with the curves of the house. At least eight men, four on each side, could work together, but their position was at once uncomfortable and precarious, notwithstanding the iron hand-rails; a fall from the top would almost certainly have meant sudden death. This remarkable ladder ran on a miniature rail-track, and to move it along as thinning progressed was by no means an easy task. Two men on top, one on each side, eased the unwieldy machine along by gripping the stout wires on the roof, while others below pushed the horrid thing forward. A little carelessness, and the weighty Jacob's ladder would have overbalanced, and there would have been an inquest! However, the ladder served its purpose, for how else could the tying, pruning and thinning have been conducted without it? In modern days a much lighter structure would have been built, with strong wire cables across to hold it firm and steady.

The Arboretum had disappeared with the curtailment of the gardens, but fruit trees abounded; some of the Pears were models of pyramidal training, and these were Mr. BARRON's delight and special care. The modest plantation of standard-trained Peaches and Nectarines generally gave a good account of itself; this surprised me as I had been used to long, south-facing walls, where Peaches and Nectarines trained thereto were the pride of the garden and yielded abundantly. Later, much later, at Brentford, I proved that in the majority of seasons standard Peach trees cropped well, but now, alas! my trees are passing, as the competition with Apple trees and flowering shrubs over the fence, in a neighbour's garden, is getting too severe for them.

Trials of fruits, flowers and vegetables have always been a notable and extremely useful feature of the Society's work. THOMAS ANDREW KNIGHT appreciated the value of Trials, as others have done since his day. Trials of Paeonies, Pansies, Irises and Michaelmas Daisies were conducted while I was at Chiswick. In connection with the latter, an amusing experience arose. The Committee appointed to assess the garden value of the numerous varieties failed to materialise, or, rather, Mr. WILLIAM MARSHALL, the Chairman, was the only member who put in an appearance. For some time he waited, chatting with Mr. BARRON and me; then, out of patience, he left the garden. Soon afterwards, Mr. PETER BARR arrived, so I hurried after Mr. MARSHALL

and caught up with him at Chiswick Station. He said PETER could stop as long as he liked, but he was not coming back ; he handed me an excellent cigar and bade me good day. PETER BARR was wrathful ; BARRON gave him no sympathy and turned him over to me. So, with the Trial Book in hand, I accompanied the grand old man of the Daffodil world. He wanted to prepare descriptions of the varieties and discover who were the raisers or senders. The afternoon wore on, and PETER worked away steadily, until my patience gave out, and as it was now long after closing time I told him I had finished for the day and must lock up the book of records. Peering over his horn-rimmed spectacles, he told me I was unlike the young men of his day ; *they* were eager to learn and would have gladly spent the remaining daylight in studying Michaelmas Daisies with an acknowledged expert ! The fact of the matter was that PETER BARR needed the descriptions for his catalogue and did not wish to make a second journey to Chiswick for that purpose !

The records of the Society show that many Horticultural Conferences, as well as Exhibitions, were held at Chiswick, in the Great Vinery. Apples, Pears, Orchids and Conifers were among the most important of the Conferences held in the later days. The Conifer Conference remains in my memory for two reasons. I had never made a serious study of Conifers, so here, and in the collections at Kew, I had a chance to add something to my horticultural equipment. Mr. MALCOLM DUNN was one of the speakers and his broad Scots speech and rather grating voice bewildered me : I could make nothing of it except when, quite frequently, he referred to *Cupressus macrocarpa*, but there appeared to be at least six R's in the name of this species, and capital ones at that !

Fairly good ranges of glass houses existed, but the famous collection of Orchids had long since disappeared. The Vineries housed 'Gros Colmar,' 'Gros Maroc' and 'Black Hamburgh' vines and the produce—as in the case of all other fruits and Tomatos—was sold, much of it locally, but consignments were also sent to Fellows living much farther away. Several houses were devoted to trials of green-house plants and one very fine span-roofed house contained a complete collection of varieties of Figs, and the plants were grown splendidly. Mr. BARRON's view was that a Fig was at its best when it had a tear in its eye ; I proved he was correct. The Fruit Room, as may be gathered, was an important building ; there were only three keys : one each for BARRON, WAUGH and myself ; "safe bind, safe find" was a law as well as a proverb at Chiswick, for pilfering was by no means rare, especially when fruits were ripening.

At least one other matter concerning Chiswick deserves more than passing reference—the Chiswick Gardens Mutual Improvement Society. The meetings were held once a week in the Council Room during the winter, gardeners from the surrounding estates came to them and there was a standing invitation to Kew men to join in—an invitation they were not slow to accept. Debates followed the papers

—all contributed by members—and it was here and at the “Kew Mutual” that many of us learned to clothe our thoughts in words, find ready expression, and lose all nervousness when addressing a meeting. JOHN FRASER was the genial Chairman during my knowledge of the meetings, and even then his wide knowledge and magnificent memory made us wonder “that one small head could carry all he knew.”

BARRON retired after a long and faithful period of service and was succeeded as Superintendent by Mr. S. T. WRIGHT, whose genial personality made him one of the finest assets the R.H.S. ever had. BARRON passed away, the Gardens became more closely surrounded by houses and those in authority looked around for another site. Before any agreement had been reached, however, Mr. G. F. WILSON’s old garden at Wisley became available, thanks to the generosity of Sir THOMAS HANBURY, and so Chiswick Gardens passed away in 1904. Many famous men worked and studied at Chiswick; many men gained fame by reason of their experience at Chiswick—GLENDENNING, the two THOMPSONS, BARRON, WRIGHT, JOHN FRASER, JOHN WEATHERS, and JOSEPH PAXTON—most famous of all.

To-day, all that remains to remind one of these famous Gardens is a narrow passage behind the Brentford and Chiswick Town Hall; its name is Horticultural Place, and even that title means nothing to the thousands who cross Turnham Green and pass along Sutton Court Road—*sic transit gloria.*

GARDEN NOTES.

Paeonia Lemoinei ‘L’Espérance.’—This hybrid between the two Chinese species, *P. lutea* and *P. suffruticosa* (*P. Moutan*), was made by Messrs. V. Lemoine et fils, of Nancy, France, and placed on the market in, or prior to, 1911. When exhibited by Messrs. Kelway & Son in London in June 1913 it received an Award of Merit, and in 1931 an unanimous First Class Certificate. On the latter occasion the blooms were cut from the plant shown in the photograph (fig. 109), growing in the garden of the late Mr. HIATT BAKER at “Oaklands,” Almondsbury, near Bristol, where it has now flourished for more than twenty years. Mr. G. HULBERT, gardener to Mrs. BAKER, informs me that it annually produces some forty to fifty flowers, each 6 to 8 inches wide, composed of two rows of pale yellow petals stained crimson at the base and with similarly tinted stamen filaments.

This specimen has lived in a high, well-drained position in the rock garden, sheltered on the north side, and is now approximately 4 to 5 feet in height and width. As a flowering shrub it is in the front rank, although requiring some years to become established and give a display like that shown in the illustration.

B. O. MULLIGAN.

JOURNAL OF THE ROYAL HORTICULTURAL SOCIETY

Vol. LXV



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23 APR. 1

December 1940

THE SECRETARY'S PAGE.

PROGRAMME, 1941.

THE customary programme of events is unfortunately hampered by the war. A few words on the proposed activities of the Society for 1941 will surely be of interest to all those who have the welfare of the Society and its work at heart.

The Annual Meeting to receive the year's report and accounts will be held on Tuesday, February 25, 1941, at 3 P.M., on the Society's premises.

Flower Shows, should circumstances in any way permit, will be held during the year. Announcements of Shows and other activities will be found in the JOURNAL and will be circulated to the Press.

At the Gardens at Wisley special emphasis is being laid on food production, and the following demonstrations will take place :

Vegetable Garden.

- March 5, 6 . Outdoor seed bed and seed sowing. 2-4 P.M.
May 14, 15 . Control of vegetable pests and diseases. 2-4 P.M.
May 28, 29 . Thinning, transplanting and successional cropping.
 2-4 P.M.
Sept. 17, 18 . Harvesting and storing. 2-4 P.M.
Oct. 8, 9 . Digging, trenching, manuring and composting.
 2-4 P.M.

Fruit Garden.

- April 2, 3 . Spring spraying of fruit trees. 2-4 P.M.
July 16, 17 . Summer pruning of fruit trees. 2-4 P.M.
Nov. 5, 6 . Planting fruit trees and Roses. 2-4 P.M.
Dec. 3, 4 . Pruning of fruit trees. 11 A.M.-1 P.M.

The flower gardens should not be entirely neglected, and for them the following demonstrations are arranged :

March 12, 13 . Rose pruning and pruning of shrubs. 2-4 P.M.

June 4, 5 . Summer pruning of shrubs. 2-4 P.M.

Aug. 20, 21 . Vegetative propagation of plants. 2-4 P.M.

In the case of bad weather at the times of the demonstrations, arrangements will be made for a talk, illustrated by lantern slides. Fellows and their friends are asked to notify the Director, R.H.S. Gardens, Wisley, nr. Ripley, Surrey, of their intention to attend.

In addition to the demonstrations, the trials of vegetables will include—

Outdoor Tomatos ;

Spring-sown Cabbages (including earliest and latest varieties) ;

Turnips (including Swedes) ;

Cauliflowers (autumn-sown) ;

Onions (autumn and spring) : special demonstration ;

Carrots : special demonstration.

SUBSCRIPTIONS, 1941.

To carry out successfully this somewhat elaborate programme in the interests of food production, the continued support of the Fellows and Associates is pleaded for. They are reminded that their subscriptions fall due on January 1, and any changes in personal or banker's addresses are particularly asked for so that tickets and JOURNALS may be forwarded punctually.

DISTRIBUTION OF SEEDS AND PLANTS.

A distribution of seeds and plants will take place in the spring of 1941 as usual, and will include 'Dutch Brown' Beans and 'Comtesse de Chambord' Haricots. Particulars will be sent out in the January JOURNAL. Distribution will only be made on payment of the subscription for the year 1941.

PUBLICATIONS.

The Royal Horticultural Society's Diary is now published and will make a useful seasonal gift. The selling price, including Purchase Tax, is as follows :

In Pluviusin, with back loop and pencil	. 3s. 4d. post free
In Morocco leather, with pencil (not refillable)	. 5s. 2d. " "
In refillable Crocodile case, with card and stamp	
pockets	. 8s. 3d. " "
Refills for Crocodile case	. 2s. od. " "

It is the intention to continue the Society's programme of publications and more especially those dealing with food production.

EXAMINATIONS.

The closing date for entries for the Teachers' Examinations is December 18, 1940; for the General Examination, January 13, 1941, and for the National Diploma, February 1, 1941.

RED CROSS SALES.

Owing to the amount of work entailed in the three sales so successfully held in Birmingham, London and Manchester, the full report is held over until the January JOURNAL. The Society's thanks are due to all those who generously gave and who generously bought, as well as to the members of the London and local Committees.

POLICY FOR ALLOTMENTS AND GARDENS.

The Ministry of Agriculture and Fisheries asks that the following information be brought to the notice of Fellows and Associates:

"There is no doubt that the first consideration of private gardeners and allotment holders should be to produce a steady stream of vegetables in every month of the year to keep the home supplied with the vegetables that are needed.

"Where production can be carried beyond this stage, it is important to concentrate on crops of which supplies were previously imported from the Channel Islands, European countries and elsewhere, for such crops are most likely to find a ready market. To assist growers, the Ministry proposes to publish a list of these crops, with the object of increasing supplies since imports are no longer available. For 1941, increases are desired of:

Onions	20,000 acres
Peas (for drying)	20,000 "
Haricot Beans	5,000 "
Tomatos	1,000 "
Cabbages (for pickling)	200 "
Cauliflowers (for pickling)	1,000 "
Broccoli	700 "
Early Potatos	5,000 "
Early Cabbage (for marketing before March 15)	300 "
Gherkins	100 "
Shallots	100 "
Winter Lettuce	

"Of these crops, winter Lettuce, early Cabbage, early Potatos, and Broccoli are recommended only for the South-west of England. Others may not be very suitable for garden and allotment cultivation, but Tomatos are well suited for cultivation under glass, and in favourable situations, in the open. The position with regard to Carrots has recently been reviewed; no special efforts

need now be made to secure a surplus of Carrots in gardens and allotments in 1941.

"If gardeners throughout the country will follow this plan, they will have the satisfaction of producing vegetables of types formerly imported and of which increased "home" production is desired in the National Interest."

TRAINING WOMEN GARDENERS IN WAR-TIME.

The scheme for training women gardeners in war-time, recently launched by the Women's Farm and Garden Association, progresses well. The Scheme provides an opportunity for free practical training in horticulture, which should appeal to girls wanting a form of war work which also provides a basis for a future career. It also helps to supply the demand for unskilled or semi-skilled labour in gardens where there is a good head gardener able and willing to teach. More apprenticeship centres, such as that provided in Wiltshire by Lady Lucas at Woodyates Manor, are urgently needed in other districts to extend the scheme and make a really useful contribution to the food production of the country. Pupils spend a few weeks working in the Woodyates garden before taking up their apprenticeship posts, as this enables the organizer to choose the most suitable types for each training garden and to avoid misfits. Anyone interested should write to Miss B. Colvin, Woodyates Manor, Salisbury.

AFFILIATED SOCIETIES AND FOOD PRODUCTION.

A special letter is being addressed by the President to all affiliated societies encouraging them to develop the food production side of their activities and make use of the services of the Society's panel of lecturers and demonstrators. It is hoped that an enthusiastic response will be the result.

The offer by the Society of a Knightian medal for award to the member having the best cultivated garden or allotment in 1940 was very generally welcomed and over two hundred such medals have been granted. It is desired to repeat this again in 1941 and particulars are obtainable from the Secretary, Royal Horticultural Society, Vincent Square, London, S.W. 1.

WISLEY IN DECEMBER.

THOSE plants which enjoy the protection of the greenhouses are naturally the chief source of flowers at this season, but there are also some berried shrubs which are still ornamental and a few hardy shrubs or plants which flower in mid-winter.

Beginning at the first, or Half-hardy house, visitors will probably find that the hybrid Nerines are still blooming although some have been in flower since September, and accompanying them the bright blue, sub-shrubby *Lithospermum rosmarinifolium*. Against the end wall or trained on the pillars are several red, yellow, or buff-coloured Abutilons, the tall *Calceolaria Pavonii* with yellow pouch-shaped flowers typical of the race, *Clematis cirrhosa* from southern Europe with white, bowl-shaped blossoms (Fig. 113), and possibly the earliest golden flowers of *Cassia stipulacea*, an attractive shrub from Chile.

Some excellent plants are to be found in the large Temperate house, notably the specimen of *Tibouchina semidecandra*, a tall shrub with handsome royal purple flowers, the Mexican *Sphaeralcea umbellata*, a shrubby wine-red Mallow, *Alberta magna*, bearing tubular, waxy red blossoms, *Agapetes macrantha* with scarlet bells, the first of the forms of *Camellia japonica magnoliaeflora* (Fig. 112), also one of the most conspicuous with its pale pink, water-lily-like blooms and is not so vigorous as most, and the single 'White Swan.' Besides these, various species of Acacia strike a note of yellow, and the long crimson or red spikes of Epacris with their innumerable flowers are outstanding, as well as notable for an extended flowering season. The South African Heath, *Erica canaliculata*, is generally smothered during this month with a profusion of tiny white bells, and the sight of a four-foot bush so covered is worth a visit. Of interest too are the clusters of oval fruits on the Tree Tomato, *Cyphomandra betacea*.

In the Alpine house there are a few plants to be mentioned. *Aster Pappei*, a dwarf bush with bright blue Daisy flowers, continues to bloom until the weather becomes too severe, and among others which will probably accompany it are the rosy-purple *Cyclamen ibericum*, white *Iberis sempervirens* from southern Italy and Tunis, *Chrysanthemum Mawii*, a slender, pink-flowered little plant from the Atlas mountains, and *Erigeron pinnatisectus* with lavender flowers on short stems. Others, including *Eriogonum nivale*, *Artemisia brachyphylla*, the New Zealand *Leucogenes grandiceps*, and the succulent *Cotyledon Purpusii* attract attention for their grey foliage and are worth growing for this feature alone.

In the Rock garden there may be flowers on *Primula Winteri* tucked under the lee of a rock in a sheltered spot, and the pale blue of *Vinca difformis*, a Periwinkle from south-western Europe and northern Africa. *Mahonia japonica*, of which there is a large specimen

in the Wild garden, now begins a long season, and is most welcome for the fragrance of its pendent, soft yellow flower spikes. The Mahonias in general are desirable shade-loving evergreen shrubs, and the recently introduced Chinese *M. lomariifolia* is thriving with other species in the Rhododendron dell on Battleston hill. Among the scented flowers, too, *Viburnum fragrans*, represented both in the Wild and Award of Merit gardens, can be gathered and brought into the house ; some plants continue to bloom until about March.

Berried shrubs in Seven Acres are likely to be confined to Berberises this season, since the previous winter cut back the branches of Coton-easters and Pyracanths very severely, but flowers should be present on *Prunus subhirtella* var. *autumnalis*, of which there is a large bush near the western end opposite the Heath garden, and among the Heaths themselves, especially the numerous forms of *Erica carnea* and its taller hybrid *E. darleyensis*. The latter is rosy-lilac in tone, while the former may be had in various colours from white through rose and pink to crimson-red, and are invaluable for brightening the garden in the dullest months of the year.

In the vegetable ground, adjacent to Wisley village, are a variety of winter crops now ready for use or maturing for cutting or digging in the early months of 1941.

Of the Cabbage tribe there are Brussels Sprouts, of which the latest is 'Cambridge No. 5,' Sprouting Broccoli both 'Purple' and 'Kentish Green,' 'Snow's Winter White' Broccoli, and the last of the Savoys, 'Omega,' sown in mid-May like Cabbage 'January King.' The numerous Kales deserve particular mention, for although they are not ready for use until January or later they are by this time well grown and worth inspection by anyone interested. They include 'Cottagers,' 'Drumhead,' 'Russian,' 'Thousand-headed,' and several sort of Rape-Kales, such as 'Asparagus,' 'Labrador,' and 'Scotch Curled,' together forming the most reliable and useful group of green vegetables for the difficult period from January to April. Most of them have been sown where they stand since they do not transplant easily.

Among root crops still in the ground are Parsnips, Hamburg Parsley, which is equally hardy and of a distinctive flavour, Carrots ('Early Market') and Turnips ('Green-top Stone'), both sown at the end of July, and finally for variety Leeks and Celery.

THE KITCHEN GARDEN IN DECEMBER.

EVENTS since this series began twelve months ago have only served to emphasize the need for more intensive cultivation of vegetables in private gardens, and at this point it would be time well spent to consider fully the successes and failures of the past season. It will be well to know, in the first place, what shortages occurred in supplies of vegetables during any particular month of the year and to endeavour, by means of increasing the area devoted to any particular crop, to make good such deficiencies. If it is not possible to increase the amount of space to be allotted to vegetables, much may be done to lessen the risk of shortage by revising the choice of subjects to be grown, or possibly by a more careful selection of varieties which will mature earlier or later than those grown last year. In the same way, if it is remembered that, possibly during the summer months, certain crops overlapped with the result that a period of glut obtained, then it is obvious that adjustment is necessary in the amount of space devoted to these crops or more care should be exercised in the choice of varieties.

At the moment it is of more than usual importance to refrain from using the more hardy vegetables, even though this course may result in a lack of variety during the coming weeks. In the new year it is probable that shortages may occur and all vegetables in store, as well as Leeks, Kales and Savoys, should be left until the last moment before use.

An inspection should be made of clamps and other stores of Beet, Onions, Carrots and Potatos, and any which have begun to decay should be removed. With the approach of harder weather it is very necessary that Potatos, both seed and ware, should be fully protected from frost.

Cultivation work in the garden will consist for the main part of preparation of the ground—digging, liming, manuring and, of course, clearing away all vegetable refuse. Sticks which have been used to support Runner Beans and other vegetables should be removed as soon as their period of usefulness is over and should not be left in the ground any longer than is necessary, as they will only rot and be unfit for use again next year. Some protection may be given to plantings of Broccoli by heeling them over towards the north, and, if not already done, straw or Bracken should be packed closely round any remaining rows of Celery to prolong their period of use until as late as possible. Plants in frames should receive careful attention during the coming months. Decaying leaves and any refuse likely to harbour disease should be scrupulously removed and as much air as possible admitted upon favourable days. The soil between the plants should be stirred on fairly frequent occasions.

Preparations should be put in hand now if it is desired to force a few roots of Seakale to provide a change early in the coming year, and, where facilities exist, a welcome variation may be obtained by successive sowings made at regular intervals of Mustard and Cress; the Cress, of course, should be sown two or three days earlier than the Mustard.

Complete planting as soon as possible, but never plant when the soil is sticky. Wait until the ground is friable. The trees and bushes will come to no harm if they are heeled in. Prepare the tree for planting by cutting back any coarse or damaged roots, employing a sloping upward cut. Take out a hole large enough to permit the roots being spread out in an even and uniform manner. Gradually fill in the hole, working fine soil among the roots and making firm by treading as the work proceeds. Do not plant deeply, but keep the tree or bush at the same soil level as it was in the nursery. This can usually be seen by a ring of soil adhering to the stem. In the open garden where the site is an exposed one, stake the trees to prevent the roots being loosened by the wind. Trees planted against walls are loosely tied to the trellis to allow the soil to settle down; after a period of about six weeks the branches can be properly secured.

Spray top fruits, and Gooseberries, Black and Red Currants with tar distillate wash at the strength recommended by the makers. This will cleanse the trees of Moss and Lichen and kill the eggs of Aphides and other pests. Apply the wash on a day when there is little wind and when rain is not likely to follow. Thoroughly wet every part of the tree, driving the wash into all cracks and crevices. Examine grease bands and remove any foreign material such as leaves. If necessary, apply some more sticky material to the band.

Where the pruning of Apple and Pear trees consists of severely cutting back all laterals each winter, the effect on the branches of such trees as they get older is that they produce a mass of gnarled spurs. New growth becomes very weak and the too numerous fruit buds starve each other and produce poor, undersized fruits. This condition can be corrected and the tree rejuvenated by completely removing half the spurs. Not only should this be done, but the retained spurs should be shortened back by half their length to a good bud. This treatment, combined with suitable manuring, has a remarkably stimulating effect. Strong and healthy growths arise from the shortened spurs, and these lay the foundation for young, vigorous, better fruiting wood.

Close the early viney and gradually work the temperature up to about 55° to 60° by day and about 50° by night. Syringe and damp down twice a day and regulate the temperature by using the top ventilators, but shut down early to trap the sun heat. Shut down the early Peach house but do not employ artificial heat except to warm the pipes during frosty weather. It is best to wait until the buds start swelling before employing much pipe heat.

SOME SEASONAL PESTS OF GARDEN VEGETABLES AND THEIR CONTROL.

By G. FOX-WILSON, F.R.E.S., F.L.S., N.D.H.

[*Resume* of a Lecture given on May 21, 1940; Mr. J. C. F. FRYER, O.B.E., M.A., in the Chair.]

A FAMILIAR slogan these days is "Grow More Food," but it should be added that merely to increase the area under cultivation may mean more waste if certain measures are not undertaken to reduce the amount of damage to food crops from the ravages of animal pests and disease organisms.

Our remarks will be confined to a review of some of the more common pests of vegetables, and to suggest methods of prevention and control in the kitchen garden.

Plant pests have undoubtedly increased within the memory of living man, and this factor is due to many reasons. As a result of our intensive methods of cultivation of economic crops, ideal conditions have been provided for the increase of animal pests, and species of plant-feeding insects or allied animals are able to multiply rapidly when food acceptable to them is grown on a considerable scale.

It may be desirable to stress the importance of cultural control measures and their effect in preventing or reducing infestations of pests.

By the term "Cultural Methods" is meant the application of hygienic principles to cultivation. Healthy plants are able to withstand the attack of many pests better than plants which are weakened as a result of nutritional deficiencies due to injudicious manuring, of the evil effects of excessive soil humidity arising from defective drainage, or drought.

Clean cultivation is a term that includes the destruction of weeds, the complete removal of "Volunteer" plants, the removal of crop remnants, and the correct disposal of garden refuse of all kinds.

With regard to *weeds*, the effect is threefold: firstly, they tend to reduce the maximum yield of a crop by robbing the soil of moisture and of soil nutrients; secondly, they serve either as alternate hosts (*e.g.* for the Bean *Aphis*), or as wild hosts (*e.g.* for Flea Beetles) for pests, which feed and multiply on wild plants until such time as they transfer their attention to cultivated plants; and, thirdly, they provide harbourage for pests, such as Click Beetles and Crane Flies, which prefer to lay their eggs in weedy rather than in clean ground (SMITH (11)).

Volunteer plants are a source of danger in that they serve as reservoirs in which a pest can survive over a period of months and even from one year to another. For instance, the incomplete lifting of a Potato crop infected with Eelworm will nullify the advantages of pest avoidance to be gained by the practice of crop rotation.

The disposal of crop remnants is an important operation and much is to be gained by lifting a crop as soon as harvesting is completed. To leave old Cabbage and Brussels Sprout plants in the ground for many weeks after the crop is harvested is to encourage the Cabbage Aphid, which will hatch from eggs deposited on the stumps the previous autumn and fly off to seedling Brassicas in spring. Such stumps should be lifted as soon as possible in early spring, and either burned, stacked and dried, or placed on a correctly prepared compost heap.

TABLE I. SPECIES OF MOLLUSCS, EELWORMS, INSECTS AND ALLIED PESTS ATTACKING VEGETABLES IN THE BRITISH ISLANDS.

	Mollusca.	Nematoda.	Crustacea.	Diplopoda.	Acarina.	Collembola.	Orthoptera.	Thysanoptera.	Hemiptera.	Homoptera.	Lepidoptera.	Coleoptera.	Diptera.	Total Species
<i>N.O. Chenopodiaceae :</i>														
Beetroot . . .	—	—	1	—	3	—	1	—	—	—	2	4	5	4 20
Spinach . . .	—	—	—	—	—	—	—	—	—	4	3	1	2	10
<i>N.O. Compositae :</i>														
Lettuce . . .	3	1	—	6	—	3	—	1	—	16	8	8	9	55
<i>N.O. Cruciferae :</i>														
Broccoli . . .	2	1	—	3	—	2	—	—	—	2	10	11	3	34
Brussels Sprouts	1	1	—	—	—	1	—	1	1	4	7	11	3	30
Cabbage . . .	5	2	—	4	—	4	—	—	1	3	16	18	9	62
Cauliflower . . .	4	1	—	1	—	1	—	—	—	2	8	14	4	35
Kale . . .	—	1	—	—	—	—	—	—	—	2	3	10	2	19
Radish . . .	—	—	—	2	1	1	1	—	—	1	1	8	2	17
Savoy . . .	—	1	—	—	—	—	—	—	—	3	4	3	2	13
Swede . . .	3	1	—	1	—	1	—	1	—	3	12	20	11	54
Turnip . . .	2	1	—	1	—	4	—	—	—	3	7	20	5	43
<i>N.O. Leguminosae :</i>														
Beans, Broad . . .	1	2	—	2	—	1	—	—	3	4	3	9	3	27
Beans, Dwarf . . .	—	—	1	1	1	1	—	1	2	1	—	2	1	11
Beans, French . . .	1	1	1	1	1	1	—	1	1	3	—	4	3	18
Beans, Runner . . .	3	—	1	3	1	2	1	1	2	6	1	3	1	25
Pea . . .	2	2	—	3	—	2	—	3	—	3	2	10	7	34
<i>N.O. Liliaceas :</i>														
Asparagus . . .	2	—	1	3	—	1	—	—	—	2	2	3	2	16
Leek . . .	—	—	1	1	3	—	1	—	—	3	—	1	1	7
Onion . . .	—	—	1	—	—	—	—	1	—	7	2	2	2	18
<i>N.O. Solanaceae :</i>														
Potato . . .	11	2	—	6	1	4	1	—	5	23	13	12	3	81
<i>N.O. Umbelliferae</i>														
Carrot . . .	2	2	—	2	—	2	—	—	—	6	3	4	3	24
Celery . . .	4	3	—	2	—	1	—	—	—	5	8	2	2	27
Parsnip . . .	1	2	—	1	—	—	—	—	9	4	3	4	4	24

The gardener is too often tempted to resort to the spraying machine at the slightest sign of pest injury. The operations of spraying and dusting—that is, the chemical control of pests—should be looked upon as the second line of defence ; the first line being all that is covered by the words "Good, Clean and Thorough Cultivation."

Crop rotation is an old established practice devised primarily to conserve or to increase soil fertility ; and, secondarily, to avoid the building-up of a high population of some pest in a particular area.

CLIMATIC FACTORS AND THEIR EFFECT ON PESTS.

The evil effects from unfavourable weather on plants in the open garden are beyond the control of the cultivator except in such instances where he may overcome the troubles that arise from abnormal and subnormal temperatures, excessive rainfall, drought, and high winds by providing protective covers in the form of frames, cloches and Dutch lights ; by effective drainage ; by deep mulching with dry straw and bracken ; by wind-breaks ; and so on.

Recent investigations have shown that, with the exception of the Cabbage White Fly whose host plants in many districts were destroyed during the past winter, the majority of insect pests of vegetables successfully survived the rigours of last winter. For instance, the percentage of viable eggs of the Bean Aphid (*Aphis fabae*) on *Euonymus* species on shoots exposed in the open ground was 92 per cent., as compared with 24 per cent. on similar shoots protected in an insectary.

The effect of a severe winter, however, on bird life is often disastrous and large numbers of insectivorous birds are killed owing to food shortage, to an absence of sufficient protective cover, to the evil effects of prolonged subnormal temperatures, and to a "glazed frost," which sealed the wings of many birds, thereby preventing flight, and caused subsequent starvation.

While most of our garden pests survived the past winter without high mortality, their natural enemies in the form of insectivorous birds suffered severely from the extreme cold and deep snow.

DISTRIBUTION OF VEGETABLE PESTS.

There is a marked variation in the distribution of insect pests of vegetables, even in this country, for some are widely and evenly distributed throughout the British Isles (Wireworms, Flea Beetles) ; some are generally distributed but reach only epidemic proportions in certain districts (Asparagus Beetle) ; while others are more localized and confined to certain counties (Cabbage White Fly) (fig. 114).

Some insect pests of vegetables that occur in this country have a wide geographical range extending over Europe, Canada and the United States of America (Carrot Fly, Cabbage Root Fly, Onion Fly), while a few are cosmopolitan (Diamond Back Moth), *vide BALACHOWSKY and MESNIL* (2).

THE FOOD OF VEGETABLE PESTS.

It has been estimated that nearly half (45 to 50 per cent.) of the known species of insects in a given area are plant feeding and that few plants escape injury from one or more species of insects (UVAROV (13)).

The methods by which insects obtain food from plants differ widely as does also the part of the plant attacked. The chief methods of feeding are biting and sucking, the former consisting of the devouring of plant tissues with the aid of mandibles or jaws, the latter of abstracting the cell contents by means of an elongated piercing and sucking mouth. There are, however, great modifications in the mouthparts of insects, but space will not allow a general discussion of them here.

Again, there are marked differences in the portion of the plant chosen by the insect during feeding. In the case of biting insects, some feed openly on the leaves (Flea Beetles, Pea and Bean Weevil), some feed on the aerial portions but lie hidden in the leaves (Celery Fly) or seeds (Pea Moth, Bruchid Beetles), and others are subterranean pests feeding in (Cabbage and Turnip Gall Weevil) and on the roots (Wireworms, Cabbage Root Fly). The same variation in feeding habits is found among sucking insects, for some feed openly on the leaves and shoots (Bean Aphis), some on the aerial portions but partially hidden owing to the extreme curling of the foliage (Potato Aphides), while others feed below ground (Lettuce Root Aphis).

The indirect damage caused by certain insects, namely Aphides, is that they act as agents in transmitting virus diseases, especially in the case of the Potato crop. The conditions in gardens are particularly favourable for the spread of virus diseases owing to the sheltered position in which the plants are grown, to the severe infestations of Aphides which the small grower is disinclined to take any active measures against by spraying, and to the fact that diseased Potatos are so frequently found in the neighbouring gardens, thereby providing infective foci for such diseases (1).

TABLE II.

1. Non-Selective Feeders :

Bean Aphis	<i>Aphis fabae</i> (summer broods).
Cutworms	<i>Agrotis species.</i>
Swift Moth larvae	<i>Hepialus species.</i>
Wireworms	<i>Ariotes</i> and <i>Athous species.</i>
Leatherjackets	<i>Tipula species.</i>

2. Somewhat Selective Feeders :

Pea Thrips	<i>Kahothrips pisivorus.</i>
Flea Beetles.	<i>Phyllotreta species.</i>
Pea and Bean Weevil.	<i>Sitona lineata.</i>
Celery Fly	<i>Acidia heraclei.</i>
Carrot Fly	<i>Psila rosae.</i>
Cabbage Root Fly	<i>Delia brassicae.</i>

3. Very Selective Feeders :

Asparagus Beetle.	<i>Crioceris asparagi.</i>
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SOME SEASONAL VEGETABLE PESTS.

The practice of grouping pests according to their food plants (*e.g.* Pests of Brassicas, Pulse, Potatos, etc.) will not be followed, and some of the more common pests of the kitchen garden that appear only during early summer are considered and are here grouped into their respective classes or orders.

EELWORM PESTS.

The two most destructive vegetable-infecting species are : (1) the Bulb and Stem Eelworm, *Anguillulina dipsaci*, and (2) the Potato Eelworm, *Heterodera schachtii*, in both of which there occur biologic races or strains.

The Bulb and Stem Eelworm is known to attack some five hundred odd species of plants, both wild and cultivated, and is a familiar pest of Narcissus bulbs, Phloxes and Onions.

The microscopic eelworms invade healthy tissues of plants, and produce well-known symptoms of attack, which, however, may be masked in plants growing in soil well supplied with manure.

This pest is frequently introduced into gardens in Narcissus bulbs ; the infected bulbs may have been planted in the kitchen garden or the owner may have decided to convert a flower border into a vegetable plot, with the result that the soil contains the "Narcissus" strain of the eelworm. This particular strain is capable of directly infecting both Onions and Parsnips, and it is advisable to avoid growing either of these crops in such land. The host preferred by the Narcissus race in the absence of Narcissus bulbs is the Onion, and infected plants become bloated in appearance and speedily succumb (fig. 117). The practice of crop rotation as a method of pest avoidance is strongly advocated, even in small gardens, to avoid disaster from eelworm infections. Eelworms may be, however, carried from one part of the garden to another in crop refuse, on the soil adhering to implements, boots, and wheelbarrow tyres, by flood water, and by other indirect means, but, if reasonable precautions are taken, the chance of indirectly spreading the pest can be greatly reduced.

The Potato Eelworm is the agent responsible for what is termed "Potato-sickness." While Potatos are also attacked by the Bulb and Stem Eelworm, outbreaks due to this pest are less widespread than those caused by the Nematode now under consideration. The danger of growing Potatos for many successive years in the same ground is that a high population of the eelworm is built up, with the result that the crop deteriorates and soon becomes unprofitable.

The roots of the developing tuber are invaded by the eelworms, and the mature females change their shape with the developing eggs and become almost spherical, appearing as small but visible cyst-like bodies attached to the roots. These hard cysts, which contain several hundred eggs, adhere to the roots and tubers. Some of the cysts remain on the tubers when lifted, others are left behind in the soil, and the normal means by which this pest is introduced into clean ground is through the cysts which adhere to the seed Potatos in dried soil, and through others which are found at the bottom of Potato sacks. This risk is avoided to a great extent if all the soil is washed off the seed tubers, and the washings disposed of so that neither the compost heap is infected nor a neighbouring garden (LEIPER (5)).

SLUGS.

Slugs, of which there are several species, are among the most destructive of garden pests and have a wide range of host plants, both wild and cultivated.

One of the most abundant species is the Grey Field Slug, *Agriolimax agrestis*, which is almost cosmopolitan in its distribution. It is practically omnivorous, and causes considerable injury to garden vegetables, more especially Brassicas, Carrots, Lettuce, Parsnip and Potato.

These pests abound in soils containing considerable amounts of organic matter arising from annual dressings of farmyard and stable manure, and in overmoist soils due to defective drainage. The population of Slugs in such land may be reduced by substituting inorganic (chemical fertilizers) for organic manures over a period of a year or so, and by providing adequate drainage to avoid waterlogging.

Recently it has been found that a bait composed of "Meta" Solid Fuel and bran provides an effective method of control. Ground that is known to be infested should be dressed with this bait before sowing or planting susceptible crops, e.g. Carrots, Lettuce, or Potatos. The Metaldehyde is purchased in the form of small tablets, which should be crushed to a fine powder and thoroughly mixed with bran at the rate of 1 ounce to 3 lbs., and distributed in small heaps on the ground on a mild and humid evening.

Considerable damage is often done to the late Potato crop in early autumn, in which case the bait should be first applied in mid-September with two or three further applications at fortnightly intervals (CAMERON (3)).

APHIS PESTS.

Two common and widely distributed Aphis pests of vegetables in early summer are the Bean Aphis, *Aphis fabae*, and the Cabbage Mealy Aphis, *Brevicoryne brassicae*.

The former is called Black Fly, Dolphin or Collier, and has a considerable range of summer food plants, including Broad Beans, Spinach, Garden Nasturtiums, Dahlias, and many wild plants, such as Thistles, Docks, and Goosefoot or Fat Hen.

The winged female Aphides alight on the top of Broad Beans, having migrated from their primary and winter hosts, chiefly the Spindle Tree (*Euonymus*), and produce colonies of both winged and wingless females which congregate in large colonies on the stems, leaves and developing pods, speedily reducing the vigour of the plants. The winged Aphides pass on to other plants, and soon the infestation is both severe and widespread. Towards the end of summer the winged females fly off from their secondary or summer hosts to their winter host plant, and give rise to a generation of wingless, egg-laying females. These are joined by winged males bred on the summer hosts, in order to pair with the egg-laying females, which later deposit their black, oval, shiny eggs in leaf scars, bud axils, and elsewhere on the shoots and branches of *Euonymus* bushes.

An old practice is to pinch out the tops of Broad Beans, and this is said to prevent an attack. This operation may check an infestation owing to the fact that the winged females alight towards the top of the plants, and in this way the first infestation may be checked, but it fails to keep the crop entirely free from the pest.

The most reliable control is to dust the infested plants, as soon as the Aphides are observed, with a Nicotine dust, which should be applied with the aid of a hand-duster during the hotter part of the day, owing to the increased toxicity of Nicotine in high temperatures. One application will not be sufficient owing to fresh invasions which arrive from the winter host and from neighbouring plants.

The *Cabbage Aphis* is one of the most destructive pests of Brassicas in this country, being partial to Broccoli, Brussels Sprouts, Cabbage and Cauliflower, and is found on wild Cruciferous plants, e.g. Charlock.

The mealy Aphides cluster on the underside of the leaves, in the heart of young plants, and on the flowering shoots of seed plants, with the result that the foliage becomes distorted, hearting is prevented, and seed production is reduced.

The indirect damage from the pest is the soiling of the edible parts—Cabbage "heads" and Sprout "buttons"—by honeydew which is excreted by the insects and forms a medium favourable to the growth of non-parasitic fungal organisms, e.g. the Sooty Moulds.

The winter is normally spent in the egg stage on the lower leaves and stalks of Cabbage, Brussels Sprouts and some other Brassicas, though small colonies of living Aphides may often be found on the leaves until mid-January. The eggs hatch in spring, and the young Aphides crawl on to the developing shoots and leaves. They increase at a considerable rate, and from mid-May to early August there are produced winged forms which fly off to infest new crops and Cruciferous weeds. Colonies are found on the new hosts during summer, autumn and early winter, and from these winged individuals appear and infest a large number of plants in the neighbourhood. Eggs are laid during October and November, and the annual cycle is thus completed (PETHERBRIDGE and WRIGHT (10)).

The degree of attack depends upon two factors, climatic and biological. The pest will reach epidemic proportions during dry, warm conditions, but cold, wet weather has an adverse effect on the pest. The biological factor that has some effect on their numbers is the presence of natural enemies, especially predaceous insects (Ladybirds and their grubs, and Hover fly larvae) and parasitic insects (the Braconid "wasp" *Aphidius*).

A common practice in too many gardens is to allow the old stumps of Cabbage and Sprouts to remain in the ground for some weeks after the crop is gathered. It is advisable to pull such stumps before the end of April and either to stack them so that they dry out, or to burn them. To allow such stumps to persist is to permit the eggs to hatch and colonies of Aphides will be formed on them from which new crops will be infested. In the author's garden freshly hatched Aphides were

found in early spring on the young shoots that had developed from Brussels Sprout stumps placed on the compost heap. The stumps had not decayed, the eggs hatched, and the young Aphides crawled up to the developing shoots.

All Brassica crops should be carefully examined in spring and summer for the presence of Aphides, and either sprayed with a nicotine-soap wash or dusted with a nicotine dust at the first sign of attack. Nicotine is a poisonous preparation, and should be used only on young plants, while mature plants should receive a non-poisonous Derris wash or dust (fig. 115).

CATERPILLAR PESTS.

The caterpillars that are often found attacking plants in the kitchen garden are those of the White Butterflies, *Pieris brassicae* and *P. rapae*, and the Cabbage Moth, *Mamestra brassicae*. The damage by all these pests is similar, the leaves being eaten and eventually skeletonized and the plants fouled by excreta. The Butterfly larvae feed on the outer leaves, while the Moth larva tends to burrow down into the heart of Cabbages.

While there are at least two broods of the Butterflies in one year, the caterpillars of the second brood are the more abundant and destructive, and injury occurs throughout August and September. The eggs of the Large White are laid in clusters, those of the Small White singly on the leaves of their host plants, which include all kinds of Brassicas, Stocks and Garden Nasturtiums, and such weeds as Charlock. The resultant caterpillars tend to feed together and, in a severe attack, the mid-rib and main veins are the only part of the leaf to be left intact. The mature larvae crawl away from the food plants and pupate in sheltered positions on railings, fences, walls, beneath window-sills, and elsewhere. †

The Cabbage Moth is less familiar for it is nocturnal in its habits and is of a dingy greyish-brown colour. The eggs are laid singly on the leaves of their numerous host plants. The colour of the caterpillars varies considerably, some being light green, some brown, others dark green or almost black. They tend to burrow down into the centre of the plants, and cause greater havoc in a shorter time than those of the Butterflies. When full grown, they crawl into the soil, form a burrow, and pupate. There may be overlapping broods, and feeding may continue until November, but they are most destructive from June to September.

In small areas it is possible to stem an attack of these pests by crushing the egg-masses of the Large White, and handpicking the young caterpillars of both the Butterflies and the Moth, and collecting the Butterfly chrysalides from palings, fences, etc. The presence of small holes in the leaves will indicate the necessity of action.

It is unwise to apply an arsenical wash to Brassicas attacked by these leaf-eating pests; instead, dust or spray the plants with a non-poisonous Derris preparation. Young caterpillars are more readily

destroyed by Derris than the mature larvae, so that applications should be made immediately the pest is seen.

Some success has followed the frequent applications of a salt solution (2 ounces to 1 gallon of water) to the leaves (THEOBALD (12)), but greater success will follow the application of a Derris wash or dust.

The mature caterpillars of the Large White are frequently found in a moribund condition and surrounded by a mass of little yellow cocoons—sometimes termed “caterpillar eggs.” From these cocoons emerge small parasitic “wasps” (*Apanteles*), which are among the natural enemies of this pest. For obvious reasons it is well to leave such cocoons undisturbed.

BEETLE AND WEEVIL PESTS.

Among the many Coleopterous enemies of garden vegetables, the Wireworm is the most familiar, destructive and widely distributed. Wireworms provide “front page” news during the present campaign when it is essential to convert large areas of grass- and waste-land into arable land. The pests abound in freshly broken pasture, and are such indiscriminate feeders that they will attack most crops that replace the turf upon which they have been accustomed to feed. The attention of our Fellows is directed to the Ministry of Agriculture’s “Growmore” Leaflet No. 11, entitled “Pests and the Breaking of Grassland,” for in that leaflet is given sound advice on the methods to be employed for reducing injury to arable crops by Wireworms and other turf-feeders.

These pests—the adults being known as Click Beetles (*Agriotes* and *Athous* species)—are most active in their larval stage during April and May and again in September to early November, during which periods they are near the surface of the soil and are actively feeding. Little injury occurs during the first year after trenching turf as the Wireworms feed upon the decaying organic matter, but serious injury does occur the second year, for then the turf has become disintegrated and the larvae seek other food, especially Carrots, Lettuce and Potato crops.

Potatoes are generally the crop chosen for growing in freshly broken grassland, and if the soil contains a high population of Wireworms, it is desirable to grow a mid-season crop in preference to a main crop. If a main crop is grown, then it should be lifted towards the end of August before the autumn-feeding period is reached. The haulm should be cut down in August to hasten ripening of the tubers and induce early maturity (FRYER and MILES (4), MILES and COHEN (6), MILES (7)).

Some crops are less susceptible to attack than others, and Broad Beans, Peas, Onions and Parsnips are less attractive than those before mentioned.

Disturbance of the soil during the spring and autumn feeding periods by the frequent use of the hoe is a practical measure for rendering conditions distasteful to the grubs.

Trapping may be resorted to in small areas, and Potato tubers and Carrots may be spitted on skewers and buried in the ground, or the heads of old Cabbage stalks may be used. The traps should be examined periodically, the Wireworms destroyed, and the traps reset.

Autumn digging or trenching of infested land is advisable, for then the Wireworms are near the surface and are exposed to their natural enemies, namely Birds ; or Poultry should be allowed free access to the freshly turned soil.

Flea Beetles (Phyllotreta species). These are among the most destructive pests attacking Cruciferous crops, especially in their early stages of growth, the seed-leaf or cotyledon stage. These active, metallic, jumping beetles swarm on the seed-leaves, producing holes in them and eventually devouring the entire leaf, especially during dry, warm periods in May.

The beetles are known, also, to attack the cotyledons below ground level before they break through the soil, and such injury may cause the gardener to blame the poor germinating qualities of the seeds.

The injury continues until the " rough leaf " stage is reached, but from this stage the plants are able to withstand the attack to a greater degree.

A careful watch should be kept on rows of Cruciferous crops in spring for the presence of the beetles, and measures taken immediately to control the pest by dusting the rows of seedlings with Derris dust. The application of a naphthalene-silica dust will prevent injury to the cotyledons before they break through the soil (PETHERBRIDGE and THOMAS (8) (9)). A convenient apparatus for reducing the number of beetles in a Brassica seed-bed is to push a Flea Beetle trap along the rows every sunny morning when the beetles are active. This trap is a toboggan-like apparatus with sloping sides, which are smeared with grease to catch the beetles as they jump from the seed-leaves disturbed by a loop of string which hangs down from the undercarriage.

These pests overwinter in large numbers among rubbish that has accumulated at the base of hedges, haystacks and elsewhere, and it is a good practice to rake out all fallen leaves from the base of hedges in close proximity to the kitchen garden during the winter, and to burn accumulations of rubbish to reduce all possible hibernating places for the beetles.

The Colorado Beetle, Leptinotarsa decemlineata, is a dangerous foreign pest, whose presence as a feeding grub or an adult must be reported immediately to the Ministry of Agriculture. Everyone who grows Potatos should be on the look-out for this pest, which has in recent years invaded the Potato fields of France, Belgium, Holland, Germany and Spain.

It is most desirable to suspect any *striped* beetle and any *red* or *reddish-yellow humpbacked* grub found on or near Potato plants, and to take no measures until instructions are received from the Ministry.

Pea and Bean Weevils, Sitona species, are common pests in spring on Leguminous crops, especially Peas and Broad Beans. The adults

eat out small portions from the leaf margins, giving the foliage a scalloped appearance. Little injury is done if the climatic conditions are favourable so that the plants grow away rapidly, but the plants may be severely checked and even killed during periods of excessive drought.

The Weevils, like Flea Beetles, overwinter among dead leaves at the base of hedges, in rubbish heaps, in tufts of grass and elsewhere, so that the annual clearance of hedge bottoms around the kitchen garden during winter is a wise plan. They leave their hibernating quarters in spring and migrate to the vegetable plot, where they attack their Leguminous host plants. Eggs are laid in the soil, and the legless white grubs feed upon the roots of the adult's host plants, especially on the nodules that occur on their roots. Little injury is, however, committed by the grubs, though growth is checked.

Rows of Peas and Broad Beans should be hoed frequently from late April and throughout May, and the production of a fine tilth lessens the degree of injury to the plants by the weevils.

The foliage of both crops may be dusted with Derris dust or with soot, or lightly sprayed with 1 ounce of lead arsenate paste to 1½ gallon of water, to which should be added a "spreader" (e.g. Saponin or some proprietary preparation) to allow a fine and even film of arsenical particles to cover completely the leaf surface (fig. 116).

The Cabbage and Turnip Gall Weevil, Ceuthorrhynchus pleurostigma, attacks a variety of Cruciferous plants, both cultivated and wild, especially Cabbage and Turnip.

All Cabbage and Brussels Sprout stumps should be lifted as early as possible in spring, and either burned or stacked loosely to dry out so that the grubs are unable to emerge from the root-galls and to pupate in the soil.

FLY PESTS.

The four most important two-winged pests in the kitchen garden in late spring and early summer are the Celery Fly or Leaf-Miner, the Carrot Fly, the Onion Fly and the Cabbage Root Fly.

The Celery Fly, Acidia heraclei, is a pest of Celery and Parsnips, in the leaves of which the maggots live and produce blisters or "blotch mines." There are two, and sometimes three, broods of this pest in the year; the flies of the first brood appearing from April to early June, those of the second brood from late July, and a third may occur in September.

A careful watch should be kept on the plants before (in the seed-boxes) and after they have been set out for blistered leaves, which should be removed and pinched to destroy the mining maggots. This operation of hand-picking and crushing is not too laborious on a small scale, and the pest may be kept within check by such methods.

Attacked plants should receive a stimulant in the form of a quick-acting fertilizer (nitrate of soda) to induce rapid growth.

Dusting the foliage at regular and frequent intervals with soot will repel the female flies from egg-laying, while thoroughly spraying both surfaces of the leaves at monthly intervals with a nicotine and soap wash will kill the maggots within their mines.

The Carrot Fly, Psila rosae, is the most serious pest of Carrots, while Celery, Parsley and Parsnip are also attacked.

Some gardeners in the South of England have despaired of growing Carrots, especially in light, dry soils. The foliage of attacked Carrots is reddish or "rusty," growth is stunted, and the roots are tunnelled by the maggots which are to be seen protruding from their burrows.

The female flies lay their eggs in crevices in the soil near the host plants, and the legless, wiry maggots make their way to the lower portion of the roots and enter the tissues.

The rows should be dressed with flake or whizzed naphthalene, at the rate of 2 ounces per yard run, at singling time and again after ten and twenty days.

The Onion Fly, Delia antiqua, is the most serious enemy of the Onion crop throughout the country, and is a pest also of Leeks and Shallots.

The greatest injury is done to young plants before and after singling, during which period the maggots will move from bulb to bulb, completely destroying entire rows. The maggots are found also in larger bulbs, when as many as twenty may be found in a single bulb, having entered through the basal plate, and speedily reducing the bulb to a rotting, putrid mass.

The greyish flies appear in spring, and the females deposit their eggs on or near the seedling plants. The dirty white maggots bore into the base of the bulb and feed on the tissues. When mature, they leave the bulbs and change into chestnut-brown puparia in the soil, and from them emerge the second brood of flies. There may be three broods in a year, extending over a period of five months, but there is considerable overlapping between the broods.

A recent and effective method of preventing attack is to dust the rows with 4 per cent. calomel dust at the rate of 1 lb. to 50 yards run. The dust may be applied with the aid of a hand-duster, and distributed along the rows so that some two inches of ground on either side of the plants receives a dressing. Two applications should be given, the first when the seedlings are some 1½ to 2 inches high, the second some ten days later (WRIGHT (14)).

All attacked mature bulbs, together with the maggots in the soil surrounding them, should be lifted and burned. The pest is detected in older bulbs by the presence of wilting leaves, which turn white and hang down on the ground.

The Cabbage Root Fly, Delia brassicae, is another widely distributed and most important pest of Brassicas, especially Cabbage and Cauliflower and, to a lesser degree, of Brussels Sprouts, Broccoli and Radish. Plants soon after setting out in their permanent quarters are seen to flag, due to the roots being eaten by the white, legless, peg-shaped maggots.

There are at least two generations a year, and a third may occur under exceptional weather conditions in late summer.

A method of preventing egg-laying in small areas is to place a tarred

disc or "collar" round the base of the stem so that the disc *lies flat* on the ground. The preparation of a fine tilth increases the effectiveness of the discs, for any stone or clod of earth near the stem causes the collar to tilt, and allows the female fly to crawl beneath it and oviposit without hindrance.

Attacked plants, together with the soil surrounding them, should be lifted and burned as soon as wilting is observed.

Again, a 4 per cent. calomel dust has been found effective against this pest, and the plants immediately after setting out and ten days later should receive an application of the dust at the rate of 1 ounce to each ten plants (WRIGHT (15)).

Another method is to sprinkle flake or whizzed naphthalene round the base of each plant, allowing about $\frac{1}{2}$ ounce per plant. Three applications should be made, the first immediately after setting out and two further dressings at ten-day intervals.

We have now considered some of the more important pests of vegetables, and those that may be termed "hardy annuals," for they appear with unfailing regularity every year, and take vast toll of our essential food plants. It is our duty as conscientious gardeners to take active preventive and remedial measures against these pests, and by such action prove that we are playing our part in conserving the food supply and are acting as "good neighbours." The neglectful gardener is a menace to himself and to others, for he may be directly responsible for spreading an infestation far and wide owing to his uncleanly habits of cultivation.

My sincere thanks are due to Mr. J. C. F. FRYER and to the Ministry's Advisory Entomologists for supplying data upon which the distribution of the Cabbage White Fly is based; and to my colleague, Mr. F. C. BROWN, for the illustrations accompanying this article.

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INDIGOFERA PENDULA.

By B. O. MULLIGAN, N.D.H.

THE name Indigofera covers a large tribe of some 300 species of shrubs or herbaceous plants, most of which are found wild in tropical or sub-tropical regions of the world, and only a few are suitable for outside cultivation in British gardens. The Kew Hand-List of Trees and Shrubs (1934) includes fourteen species, while at Wisley only six or eight distinct sorts are grown. Of these, *I. pendula* is by far the most ornamental with its long, slender, somewhat pendent racemes of Mallow-Purple (H.C.C. 630/1) or Phlox-Pink (H.C.C. 625) flowers. It is most appreciated for the length of its flowering season from early July until October on the east side of the laboratory wall, where it only receives sunshine in the morning. As it has not been grown at the Gardens in open ground, its resistance to our winter conditions has not been fully tried. Nevertheless, this particular plant has lived here for many years, flowering regularly and freely, and although cut back to the older wood during the severe weather of January and February, 1940 (and sometimes in other winters), has fully recovered and flowered as well as ever this summer.

Description.—The height of the plant is about 7–8 feet. The light brown young shoots dotted with paler lenticels, and nearly all other parts, including both sides of the leaflets, the calyx and young seed-pod, are covered with short, closely appressed hairs. The leaflets, set well apart in opposite pairs, vary in number from 7 to 13 and are more or less elliptic or elliptic-oblong in shape; each when mature is up to an inch or more in length and about half as wide, sage-green on the upper side, paler beneath, the veins distinct on both faces.

The flower racemes (fig. 118) are produced singly from the leaf axils in the upper parts of the shoots, and are remarkable for their eventual length of 9 to 12 inches or even longer, although shorter in their early stages and at the tip of the shoots. According to the Botanical Magazine, where this shrub was illustrated at t. 8745 in 1918, the racemes may reach a length of 15 or 18 inches, but even the lesser size attained at Wisley is highly effective. The numerous flowers open successively from base to tip, the older ones dropping off entirely unless they form pods, of which there are usually a few on each inflorescence. The petals are $\frac{1}{4}$ – $\frac{1}{2}$ inch long, Phlox-Pink on wings and keel, Mallow-Purple on the $\frac{1}{4}$ -inch wide standard which has an irregular white blotch within the base. The pods, very narrow in proportion to their length of an inch or more, are covered when young with appressed black hairs.

I. pendula was first discovered by Père DELAVAY in Yunnan, south-west China, in 1887, and described two years later by A. FRANCHET in *Plantæ Delavayanæ*, where it is also figured. The

species was not, however, introduced into cultivation until GEORGE FORREST again found it and sent seeds to England in 1914, from which source the plant figured in the Botanical Magazine was derived. In our JOURNAL for December 1915 (Vol. 41, part 2, p. 205), FORREST tells how it grows on the dry plain below the Lichiang range of mountains, among "a scanty mixed scrub composed of *Philadelphus* sp., *Deutzia* sp., *Lonicera Maackii*, *Berberis* sp., *Ligustrum ionandrum*, etc., all much stunted," giving us a clear idea of the conditions under which it grows in the wild state and the type of neighbour with which it finds company. Dr. HANDEL-MAZZETTI has also discovered it farther to the north in Szechwan, at altitudes from over 7,000 to nearly 11,000 feet, so that from the latter height at least it should be hardy in most parts of Britain.

For an elegant, slender shrub, flowering over a long period in the summer and not apparently needing any special soil requirements—unless it be a somewhat dry and well-drained foothold in the earth—gardeners might do worse than plant this species of *Indigofera*, at present rarely seen, but which may be propagated either by seeds or cuttings. In 1925 it received an Award of Merit when exhibited by Mr. REGINALD CORY.

GARDEN NOTES.

Rhododendron racemosum.—It is with pleasure that we publish the beautiful photograph by Mr. R. M. ADAM of *R. racemosum* (fig. 119) growing in the rock garden in the Edinburgh Botanic Garden. This Rhododendron, which has received the Society's Award of Garden Merit, was fully described in Vol. 63, p. 448. For a fairly high position among bold rock work, this Rhododendron is a most fitting subject.

BOOK REVIEWS.

"Plant Physiology." By Meirion Thomas. 8vo. xii + 596 pp. (J. & A. Churchill, London, 1940.) 21s.

This is essentially a student's and research worker's book, the value of which is demonstrated by the fact that it has passed into a second edition within five years. It discusses in considerable detail the various factors, chemical and physical, which recent research has shown to determine the growth of plants. Its utility is increased by Appendices which introduce the student to the chemistry of the various substances which function in plants and to the physical properties of aqueous solutions by which the movements and effects of these substances are regulated. A useful bibliography extends the scope of the book.

"The Advance of the Fungi." By E. C. Large. 8vo. 488 pp. (Jonathan Cape, Ltd., London, 1940.) 18s.

This is an exceptional book, one that has long been wanted. It treats the fungoid diseases of plants from the historical and human standpoint, setting out the facts connected with the discovery of each, its consequences to the farmer and gardener, and the means that have been successively adopted to deal with it

It is, however, not a technical handbook, but an introduction to principles by way of history. The Peronospora disease of Potatos—"Blight"—has its niche in English history, for, as Mr. Large recounts, its advent in Ireland led to the famine and was no small factor in bringing about the Repeal of the Corn Laws, indeed has left its mark on the subsequent troubled relations between Ireland and England. One is always asking who first introduced sulphur to the vine and hop growers, a remedy that anticipated any exact knowledge on the subject. Who invented Bordeaux mixture, the universal use of which for the vine has puzzled many travellers to account for the bright green stains on the white-washed walls of peasants' cottages in France?

Mr. Large's book is the produce of much tedious research, not only among scientific journals, but in the earlier gardening literature, as for example the old volumes of the *Gardeners' Chronicle*. He spreads his net wide, for besides the discussions of fungi he has chapters on the phylloxera of the vine, on virus diseases and on the chemical investigations which led Pasteur to his fundamental investigations of fermentation and bacterial life in general.

Mr. Large's book is written not only for the specialist but in an agreeable fashion for the general reader who would like to know something of a subject which enters universally into the production and preservation of our food supplies. It is a stimulating book which should be in the hands of every botanical and agricultural student, to help whom it is provided with a good bibliography and an adequate index.

"*Plant Growth Substances: their Chemistry and Applications, with Special Reference to Synthetics.*" By Hugh Nicol. 8vo. 148 pp. (Leonard Hill, Ltd., London, 1940.) 2nd edition. 7s. 6d.

A notice of the first edition of this book, which Dr. Nicol wrote primarily from the chemical standpoint, is in the *JOURNAL*, 64, p. 100, February 1939. The text has now been revised and enlarged.

The author now recommends for propagation by cuttings the use of indolebutyric or naphthaleneacetic acid. These are quite readily obtainable as pure chemicals, and in solution or as powders in proprietary articles. He thus brings his recommendations into line with commercial and garden practice and ceases to recommend ineffective chemicals. But he gives no critical discussion of the relative merits and failings of solutions and powders. He shows the wider experience, more recently gained, in such work and refers to the long list of plants of which cuttings have been stimulated to better rooting—this synopsis was published by the Imperial Bureau at East Malling—but no reference is made to the extensive tests made at Kew, where that unique collection of plants has afforded such varied material.

It has been claimed that the growth of entire plants can be accelerated by the application of small quantities of such substances either to seeds or to the soil or solution in which plants grow; but tests made at Jeallots Hill and Wisley did not confirm such claims. More recently minute quantities of indoleacetic acid have been successfully detected in soils (Parker-Rhodes); especially rich are soils to which farmyard manure has been added. The author is thus concerned with a developing subject on which reports continue to appear rapidly.

He states in effect (p. 20) that few or no further chemical developments have taken place, yet he omits all reference to the use of the amides, naphthylacetamide and thionaphthylacetamide (Stoutmeyer, 1939), and to tetrahydronaphthylidene-acetic acid (Tincker, 1939), of which one stereoisomeride is so highly active while the other is less so.

The book retains its value to the chemist, with its formulæ and details of solubility, etc., and to the layman, for whom chapters have been especially written; it also retains its quaint quotations, its list of references arranged in its own way, and its unusual sequence. In the first edition the author was convinced "that the proper place for a preface is the end of a book"; he now states "the preface to the second edition will be found as Chapter III." The new edition deserves its new cloth binding, but the price has increased.

M. A. H. TINCKER.

INDEX.

References in *italics* are to figures and illustrations.

- Abelia grandiflora*, 271
Aberconway, Lord, on *Camellia saluen-sis* \times *C. japonica*, 217
on Magnolias at Bodnant, 71
Abies Georgei, ripe cones, xxxix
Abutilon Milleri, 357
 striatum, 237
 Thompsonii, 237
Acacallis cyanea, 253
Acacia dealbata, 46, 297
 diffusa, 68
 pubella, 108, 130
Acantholimon ornatum, 81
Acer capillipes, 167
 cercinatum, 271, 316
 dasyarpum, 169
 Ginnala, 167, 316
 griseum, 167, 170, 316
 japonicum, 168
 laciniatum, 168
 vitifolium, 168
 korana, 167
 laetum, 167, 169
Negundo, 237
nikoense, 167, 169, 358
palmatum atropurpureum, 168
 dissectum, 168
 palmatifidum divisum, 168
 septemlobum, 168
 elegans, 168
 Osakazuka, 168
 purpureum, 168
 rubrum, 167
 rufinerve, 167
 saccharum, 167, 169
Achillea Clavennae, 307-8
 clypeolata, 199
Adenophora palustris, 231
Adonis Davidii, A.M. 188, 1
Adriance, G. W., "Propagation of Horticultural Plants," 42
Advisory work, v
Aerides Vandarum Delicate, A.M. 188, xlvi
Aesculus parvifolia, 94
 turbinata, 169
Affiliated Societies in War-time, 5
Alberta magna, 357
Allwood, M. C., "The Third and Fourth Generations," 62
"Alphabetical Iris Check List," Ed. by E. A. S. Peckham, reviewed, 354
Alpine Plants, An Early Book on, 153
Alstroemeria Dover Orange, 200
 haemantha, 199
- Alyssum saxatile*, 307-8
Amaryllis Belladonna, 270, 276, 315
"Amateur Greenhouse," by W. E. Shewell Cooper, reviewed, 310
Amelanchier canadensis, 94, 340
 x grandiflora rubescens exhb., xlvi
 laevis, 94
Anchusa Morning Glory, 200
Andes, expedition to, 289
Androsace carnea, 81
 sarmentosa, 131
 sp., P.C. iv
 Wardii, P.C. lv
Anemone hupehensis, xxxix
 japonica, 232, 272, 307, 309
 nemorosa exhb., liv
Annual General Meeting, xxiv
Anthemis Sancti-Johannis, 51, iv
 tinctoria Perry's var., 51
Antirrhinum Lothrop's Double Pink, A.M. 219, lvii
Apis tuberosa americana, 340, 342
Aponogeton distachy whole, 249
 leptocephalum (*A. Kraussianum*), 249
Apple Ajax exhb., xxxv
 Alfriston, 274
 Allington Pippin, 87
 Annie Elizabeth exhb., iii
 Arthur Turner, 87
 pruning, 360
 Baldwin, 331
 Barnack Orange exhb., xxxiv
 Beauty of Bath, 234
 pruning, 360
 of Kent exhb., iii
 Belle de Boskoop, 87
 Birkem exhb., 1
 Blenheim Orange, 331
 Bramley's Seedling, 87, 331, 333, iii
 pruning, 360
 Charles Ross, 87
 Claygate Pearmain exhb., xxxiv, 1
 Cornish Gilliflower, *pruning*, 360
 Cox's Orange Pippin, 87, 331
 pruning, 360
 Crawley Beauty, 87
 D'Arcy Spice exhb., 1
 Darulla exhb., xxxiv
 Dawn exhb., xxxv
 Early Victoria, 234
 Edward VII, 87
 Ellison's Orange, 87
 pruning, 360
 George Pyne exhb., xxxv
 Gladstone, 87

IX PROCEEDINGS OF THE ROYAL HORTICULTURAL SOCIETY.

- Apple** Gladstone pruning, 360
 Irish Peach, pruning, 360
 James Grieve, 87
 pruning, 360
 King of Tomkins County exhb., xli
 Lady Sudeley, 87, 234
 pruning, 360
 Lane's Prince Albert, 87, lii
 pruning, 360
 Laxton's Epicure, 87
 Superb, 87, xxxiv
 pruning, 360
 Lord Grosvenor, 234
 Lamourne, 87
 Suffield, 234
 Melba, 87
 Mr. Gladstone, 234
 Monarch, 87
 Mother, pruning, 360
 Newton Wonder exhb., lii
 Norfolk Beefing, exhb., lii
 Northern Spy, 332
 immune to woolly Aphis, 331
 Ontario, 87, 1
 at Wisley, 83
 Orleans Reinette, 87
 Patricia, 87
 Rosemary Russet exhb., xxxiv, xxxxv
 Rushock Pearmain exhb., 1
 St. Cecilia, 87
 Sandringham, 119, lii
 Sotwell Surprise, for trial, xxxiv
 stocks, 86
 Sturmer Pippin exhb., lii
 Wagener, 274, 1
 Wellington, 274
 Winter King exhb., xxxv
 woolly aphis, 331
 Worcester Pearmain, pruning, 360
Aquilegia Jonesii, A.M. 188, lvii
 scopulorum, A.M. 219, lviii
Araucaria araucana (imbricata), 203
Arbutus Menziesii, 131
Arctomecon californicum, 138-9, xlii
Arctostaphylos Uva-ursi, 26-7
Armeria caespitosa, 107
Aronia arbutifolia, 168
 erecta, 168
Artichoke Globe, 339
 Jerusalem, 338, 376
Asparagus Connover's Colossal exhb.,
 lvi
 Harwood's Giant exhb., lvi
 Mary Washington exhb., lvi
Asperula arcadiensis, 81
Asphodelus Plini, 347
Associates of honour, vii, xxxii
Aster, an early medal portraying, 378
 Amellus, 230, 270, 315
 Pappei, 315, 357
 Peruanos, 382
 tuberous, 382
 Victor, 307-9
Asteriscus maritimus, 232
Aubretia Kelmscott Beauty exhb., 1
 Purple exhb., 1
Auricula, Hogg and Emmerton on the,
 13
 Mr. Rea's Purple, 385
- Auricula** Mrs. Austin's Scarlet, 385
 Mrs. Bug's Fine Purple, 385
 Autumn colour at Abbotswood, 167
 Award of Garden Merit, 60, 97, 123, 187
 Awards and Medals, viii, xxxii, 129
 to plants, 27, 122, 151, 188, 219, 304,
 337
Azalea coccinea speciosa, 113
 Gloria Mundi, 113
 H. H. Hunnewell, 113
 japonica Brilliant Red, 113
 Clara Butt, 113
 Floradora, 113
 J. C. Van Thol, 113
 Kurume Hinomayo, 113
 ledifolium, 112
 occidentale hybrids, 113
 rosaeflora, 163
 stricta glauca, 114
 viscosa, 114
Azaleodendron, *see* Rhododendron
Azara microphylla, 300
- Babiana disticha, 108, 130
Baker, J. R., on a floral clock, 306
Balls, E. K., on an expedition to the
 Andes, 289
Banana Gros Michel, 327
Battatas Canadense, 347
Bean, haricot, Brown Dutch, 123-6
 Comtesse de Chambord, 123-6
 cultivation, 124
 Dwarf White Rice, *see* Comtesse
 de Chambord
 Everbearing, *see* Inépuisable
 Inépuisable, 123-6
 Masterpiece, 123-5
 Prédome à rames, 123
 White Haricot, *see* White Levia-
 than
 Leviathan, 123-6
Scarlet Runner, A.I., 101
 Badsey Wonder, 101
 Best of All, 101
 Bush Scarlet, 101
 Colossal, 101
 Cookham Dean, 101
 Dwarf Gem, 101
 Selection No. 1, 101
 Kelvedon Wonder, 101
 Peerless, 101
 Pennell's Improved Strain, 101
 Premier, 101
 Prizewinner, 101
 Improved, 101
 Scarlet Emperor Improved, 101
 Streamline, 101
 Superba, 101
 Universalis, 101
Beans, haricot, trial of, 123
 Scarlet Runner, at Wisley, 100
Beetle, Colorado, 197, 416
Begonia Bertha Balmer, A.M. 219, lvii
 boliviensis, 253
 Davisii, 253
 Délice, A.M. 219, lvii
 fuchsoides, 68, 108
 Pearcei, 253

- Begonia rosaeflora*, 253
Veitchii, 253
Berberidopsis corallina, 300
Berberis aggregata, 94
aristata, 170
brevipaniculata, 170
candidula, 94, 282
chrysosphaera at Wisley, 288
 from Tibet, 281-2
circumserrata, 358
concinna, 94
Darwinii, 93-4, 218-9, 307, 309
dictyophylla, 170
 albicalulis, 94
Francisci-Ferdinandii, 170
Hookeri latifolia, 93
Jamesiana, 358
koreana, 231
linearifolia, 218-9
 x *B. Darwinii*, 218
lologensis, 218, liv
pallens, 169
polyantha, 94
Prattii, 170
rubrostilla, 94, 170
Sieboldii, 170
sp., 421
Staphiana, 170
stenophylla, 93-4, 108, 132
subcauliflora, 94
Thunbergii, 94, 167
 atropurpurea, 93-4
Vernae, 231
virescens, 358
vulgaris, 231
Wilsonae, 170
yunnanensis, 170
Besant, J. W., on The Botanic Gardens, Glasnevin, Dublin, 349
Bewley, W. F., "Vegetable Crops under Glass," 157
"Bio-dynamical Farming and Gardening," by E. Pfeiffer, reviewed, 310
Blackberry Himalaya Giant, 274
 John Innes, 328, 332
 Merton Thornless, 328, 333
 origin of, 332
Bollea coelestis, 253
Bomarea frondea, 289
"Book of Roses, A," by J. Ramsbottom, reviewed, 101
Book Reviews, 41, 62, 101, 126, 156, 193, 264, 310, 354, 421
Boscawen, Canon A. T., The late, 198
Boswellia Carteri, 334
 thurifera, 334
Bouvardia Bridesmaid, 242
 Hogarth, 242
Brevicoryne brassicae, 412
Brison, Prof. F. R., *see* Adriance, G. W.
British Diploma of Floral Art, 196
Brussels Sprouts at Wisley, 99
 Cambridge No. 5, *A.M. 100
 Cotswold Pixie, 99
 Early Market, *A.M. 100
 Selection, *H.O. 100
 Extra Early Dwarf, *A.M. 99
 Leader, *A.M. 100
Bryanthus musciformis, lviii
Buddleia alternifolia, 94, 163
 Davidii, 95, 231, 271
 magnifica, 94
 Fellowiana, 231, 271
 globosa, 307, 309
 Ile de France, 94
 Weyeriana, 231, 271
Butomus umbellatus, 249
Butterfly, Cabbage White, 278, 289, lxviii
 Brussels Sprouts skeletonised by caterpillars, 289
 caterpillars, 289
 control, 280
 description, 279
 enemies, 280
Cabbage Harbinger, exhib., lii
Cactus Valley, Argentina, 289
Calanthe x Baron Schröder, xxxvi
Calceolaria acutifolia, 307, 309
 Darwinii, 252
 ericoides, 293
 Pavonii, 232, 272, 315, 357, 403
 violacea, 108, 130
Calendar, 1, 6, 159
Calla palustris, 249
Calluna vulgaris, 232, 271
 H. E. Beale, 271, 316
Calopogon pulchellus exhib., xlvi
Caltha palustris, 249
 plena, 106, 131, 249
 vars. exhib., liv
Cambridge Botanic Garden, 171, xlviii
Camellia japonica, 68
 magnoliaeflora, 403, lxviii
 White Swan, 403
 maliflora, 68
 reticulata exhib., xlviii
 saluenensis, 217
 x *C. japonica*, 217, lv
Campanula arvatica, 199
 cashmiriana, 231, 270, 315
 lactiflora, 200
 lasiocarpa, 199
 latifolia alba, 199
 oreadum, A.M. 220, lviii
 persicifolia, 51
 Telham Beauty, 288
 Piperi, 199
 Tymonsii, 270
 Zoysi, 199
Campsis (Bignonia) radicans, 297
Canarina campanulata, 47
Candollea cuneiformis, 68
Capitophorus fragariae, 256, 258
Caragana Gerardiana, 170
Carnation Angela Hawtin (b), *F.O.C.
 304
 Hilda Moody (b), *A.M. 304
 Robin Thain (b), *A.M. 304
Carpenteria californica, 300
Carrot Early Forcing exhib., lii
Carya porcina, 169
Caryopteris clandonensis, 94, 95
 incana (Mastacanthus), 94
Cassia stipulacea, 46, 68, 403
Cassiope fastigiata exhib., liv

lxii PROCEEDINGS OF THE ROYAL HORTICULTURAL SOCIETY.

Cattleya Mossiae, liv
 Cauliflower, Roscoff, 302
 Ceanothus dentatus, 95
 floribundus, 299
 Gloire de Versailles, 94, 95
 Marie Simon, 94
 papillosus, 95
 rigidus, 299
 Topaz, 94
 Veitchianus, 95
 Cedrus atlantica, 203
 Centaurea dealbata Steenbergii, 51
 glastrifolia, 51
 montana Elstead Purple, for trial, lvii
 Ceratostigma Willmottianum, 94
 Cercidiphyllum japonicum, 167
 Cereus peruvianus, 117
 Cestrus aurantiacum, 162, 315
 Newellii, 298
 Ceuthorrhynchus pleurostigma, 417
 Chaenomeles japonica, 107
 x cathayensis exhib., liv
 (Cvdonia) lagenaria, 107
 Chamaecyparis obtusa minima exhib., xliii
 Chamaedrys alpina, cisti flore, 235
 Chelsea Physic Garden, the, 8, 25
 Chenopodium capitatum, 252, lvii
 Cherry, Japanese, Ama-no-gawa, 132
 Cheveley, S., "A Garden goes to War," 102
 Chicory, Red Venetian exhib., xli
 "Children's Gardens," by E. L. Howard, reviewed, 157
 Chimonanthus fragrans, 48, 93
 Chionoscilla Backhousei, 66
 Chiswick Gardens, 377, 391
 Chrysablonia pulcherrima, *see* Chrysanthemum rubellum
 Chrysanthemum Alex. McAlpine (*e*), *H.C. 37
 Beaufieit (*e*), *A.M. 39
 Brilliant (*e*), *H.C. 38
 Butterglow (*e*), *A.M. 34
 Canadense, 346, 382
 tuberosum edule, 347
 Carnival (*e*), *A.M. 38
 Clara Ward (*e*), *A.M. 39
 Coppelia (*e*), *H.C. 38
 Crimson Page, *see* Clara Ward
 Debutante (*e*), *A.M. 33
 Deep Bronze Freda, *see* Terra-Cotta Freda
 demnatense, 333
 Dictator (*e*), *H.C. 38
 Early Marvel (*e*), *A.M. 36
 Elsenham White, 33
 erubescens, *see* rubellum
 Gladiator (*e*), *A.M. 39
 Goldfinder, *see* Hollicot Yellow
 Harvest Moon (*e*), *H.C. 35
 Helen Thorpe (*e*), *H.C. 36
 Hollicot Yellow (*e*), *H.C. 35
 Honeydew, A.M. 337
 John Wearing (*e*) *A.M. 38
 Mawii, 353, 403
 maximum Everest, 51
 Pauline Read, 51

Chrysanthemum Mayland White (*e*), *H.C. 34
 Mrs. Irene Torrance (*e*), *A.M. 34
 Douglas Foxwell, *see* Clara Ward
 Q. Macfadyen (*e*), *A.M. 37
 Peruanium, 382
 Peruvianum, 346, 381
 Petunia (*e*), *H.C. 40
 Peveril (*e*), *A.M. 34
 rubellum, A.G.M. (1938) 187, 272, 316, *xlii*
 Anna Hay, 187
 Clara Curtis, 187
 Salmon Freda, *A.M. 36
 Saracen (*e*), *A.M. 37
 Sunny Charm (*e*), *A.M. 34
 Sweetheart, A.M. 337
 Terra-Cotta Freda (*e*), *A.M. 38
 Toreador (*e*), *H.C. 39
 Trigo (*e*), *H.C. 37
 uliginosum, 272, 316
 Vulcan (*e*), *A.M. 39
 White Splendour (*e*), *H.C. 34
 Yellow Lichfield Cream (*e*), *H.C. 35
 Chrysanthemums, Early-Flowering, at Wisley, 33
 Cistus corbariensis, 94
 cypris, 94
 Lorettii, 94
 populifolius, 94
 purpureus, 94
 salvifolius, 94
 Citron bizzaria, 212-13
 Cladrastis tinctoria, 169
 Clematis Armandii, 219
 Apple Blossom, 219
 Buchaniana, 300
 cirrhosa, 46, 357, 403, *lviii*
 Jackmanii, 95
 Clerodendron Bungei (foetidum), 315
 Clethra alnifolia, 169, 231, 271
 Cianthus puniceus roseus exhib., *lvi*
 Clivia Hamilcar, A.M. 188, *xliv*
 Hannibal, A.M. 189, *xliv*
 miniata, 108
 Codonopsis clematidea, 199
 Colchicum autumnale, 182, 307, 309
 croaticum, 182
 hungaricum, 182
 montanum, 182
 croaticum, 182
 speciosum, 169
 Colletia cruciata, *lii*
 Colorado beetle, 197, 416
 Commercial Fruit Trials, v
 Committee, Carnation, Joint Perpetua Flowering, *xlii*
 Floral A, xxxv, xxxix, xlii, *xliv*, *xlvii*, *lvi*, *lvi*
 Floral B, xxxv, xi, xlii, *xliv*, *xlvii*, *lvi*, *lvi*
 Fruit and Vegetable, xxxiv, xxxix, xlii, *xliv*, i, *lvi*, *lvi*
 Iris, Joint, *xlii*, *lvi*, *lvi*
 Narcissus and Tulip, xxxvi. *xli*, *xlii*, *xlv*, *xlviii*, *liv*, *lvi*
 Narcissus, Joint, *lvi*
 Orchid, xxxvi, xi, xlii, *xiv*, *xlvii*, *liv*, *lvi*

- Committee, Rhododendron, Joint, xxxvi, xli, xlvi, lxvi, lv, lvii
 Rock Garden Plant, Joint, xxxvi, xli, xliii, xlvi, l, iv, lviii
 "Scientific," xxxix, xli, xliv, li, lli, lvi
 "Complete Guide to soilless Gardening," by W. F. Gericke, reviewed, 354
 Compost-making for Gardens, 75
 Composts for seed sowing, John Innes Leaflets, 265
Conandron ramondioides, 199
Conference, Rhododendron, iv
 Congress, Botanical, 46
 Genetic, vi
Convolvulus althaeoides, 231
 "Cook what you Grow," by W. E. and I. R. Shewell-Cooper, reviewed, 157
 Cooper, R. E., on First record of plant introduction, 334
 W. E. Shewell, "Amateur Greenhouse," 310
Coriaria japonica, 298
terminalis, 298
Cornus alba, 316, 358
australis, 316
Baileyi, 169
canadensis, 25, 27
controversa, 207
Kousa, 94, 169, 207-8
chinensis, 170
mas, 68, 307-8
Correa speciosa, 47, 68
Corylopsis pauciflora, 67
Cotoneaster adpressa, 25, 26
bullata, 94
congesta, 26
conspicua, 208
decora, 358
frigida hybrids, 338
Henryana, 94
horizontalis, 94, 170
humifusa, 26
lactea, 94
microphylla, 94
multiflora, 231
rotundifolia, 94
serotina, 358
Simonsii, 93-4
Cotyledon Purpuriss., 403
 Council, Report of, i
 Cowan, J. M., on The Royal Botanic Garden, Edinburgh, 77
 Coutts, J., on Furnishing a new Garden, 89
 Cran, M., "Gardens of Character," 41
 Crane, M. B., on Seed and Food in War-time, 321
 Crang, A., on Preserving Vegetables, 250
Crassula tetragona, 116-7
Crataego-Mespilus, 214
Asniersii, 214
 fruiting branches, lv
 petal section, lv
 Dardari, 214
Crataegus Carrierii, 94
Crus-galli, 94, 169
 fruiting branches, lv
prunifolia, 169
Crinum riparium, 163
Crioceris asparagi, 410
Crocopsis fulgens, 293
Crocus aureus, 47, 307-8
cancellatus, 357
chrysanthus, 25, 66
corsicus, 47
Korolkowii, 66
laevigatus, 315, 357
longiflorus, 357
niveus, 357
Pestalozzae caeruleus, 66
sativus, 182
speciosus, 169, 315
susianus, 47
Tomasinianus, 47
zonatus, 315
Cryptocarpus medularis, xli
Cryptomeria japonica, gnaurs on, li
 Cucumber A and C, 226
 Black Diamond, 226
 Carter's Outdoor, 226
 Chinese, 225
 Crystal Apple, 225
 Dania Giant Improved, 226
 Danish Pickling Improved, 226
 Delicacy, 225
 Ideal, 226, lii
 Jersey Ridge, 226
 King of the Ridge, 225
 Langelands Giant, 226
 Lemon, 225
 London Ridge, 226
 Long Green, 225-6
 Longa, *A.M. 226
 Longfellow, 226
 mosaic, 243
 Perfection, 226
 Rex, 226
 Riesenschael, 226
 Robusta, 226
 Sensation, *F.C.C. 226
 Stay Green, 226
 Straight Eight, 226
 Torpedo, 226
 Wither's Ridge, 226
 Cucumbers, outdoor, at Wisley, 225
Cupressus Lawsoniana, 93
 macrocarpa, 93, 167, 397
Currants, red, pruning, 360
 Curtis, C. H., on Chiswick Gardens, 391
Cyananthus insignis, 271
 lobatus insignis, 231
 microphyllus, 231, 271, 315
Sheriffii, 315
Cyathodes empetrifolia, 27
Cyclamen coum, 47, 66
 crested, xli
 ibericum, 357, 403
 neapolitanum, 169, 271, 315
 persicum Albatross, *A.M. 122
 vernun, 47, 66
Cylindrophyllum calamiforme, 117, xxxx
Cymbidium x Altair Exbury var., A.M.
 189, xiv
 x Balkis Exbury var., A.M. 189, xlvi
 x Delphine, Alison, lviii
 Golden Horn exhib., xl

- Cymbidium* × Hawfinch var. Emerald, A.M. 122, xxxvi
 x Janette, A. McBean, F.C.C. 189, xlvi
 x Joyful, A.M. 220, lviii
 x Queen Mary, A.M. 189, xlvi
 x Ramboda, xliii
 Colossal, A.M. 151, xlivi
 Invincible, A.M. 151, xi
 x Redpole exhib., xlivi
 x Regina exhib., xxxvi
 Rio-Rita, 119
 x Ruanda, Queen of the Pinks, A.M. 122, xxvii
 x Swift, Delight, *see* C. Wyld Court Swift, xlivi
 x Wyld Court Swift, A.M. xlvi
Cynara Cardunculus, 341
Scolymus, 339
Cyperus Papyrus—papyrus specimens from, li
Cyphomandra betacea, 119, 272, 403
Cypripedium × Aylesbury var. Picture, A.M. 122, xxxvi
 Diana Broughton, 119
 Miracle, Alpha, xxxiii
Cyrilla racemiflora, 271, 315
Cyrtanthus lutescens, 47, 68
Cytisus Adami, 213-4, 240
 petal section, lv
 albus, 94, 307, 309
 Burkwoodii, 94
 demissus, 25
 kewensis, 106, 131
Laburnum, lv
 multiflorus, 107
 (albus), 132
 praecox, 94, 107, 132
 purgans, 132
 purpureus, 213
 petal section, lv
 racemosus elegans, 108
 scoparius, 94, 132
 Andreasus, 94
 Firefly, 94
 fulgens, 94
 sulphureus, 94
- Daboecia cantabrica*, 25, 27
 polifolia, 200, 231, 271
Daffodil Show, iii
Daphne Blagayana, 66, 106, 131
Dauphinii, 48, 67
Genkwa, 131
hybrida, 48, 67
Mezereum, 48, 68, 93
 alba, 93
 odora, 119
 rupestris, 131
Sophia, 150
 tangutica, 106, 131
Decodon verticillatum, 249
Delia antiqua, 418
 brassicae, 410, 418
Delphinium elatum, 328
 nudicaule, 328
Ruysii, 328
Wellbyi, 61
- Demonstrations, practical, 44, 64, 105, 128, 161, 196, 228, 356, 399, iv
Dendrobium speciosum, 393
 Victoriae-Reginae, 253
 Deputations, vi
Deutzia crenata flore pleno, 395
 Monbeigii, 164, 200
 sp. 421
Dianthus Alwoodii exhib., xlvi
 barbatus, 307-8
 Icombe Hybrid, 163
 microlepis, 81
 Dickson, A., iv
Digitalis purpurea × *ambigua*, 288
Dimorphotheca Orange Glory, *A.M. 225
 pluvalis ringens, *A.M. 224
 Salmon Beauty, *H.C. 225
Disanthus cercidifolia, 168, 316
" Diseases of Bulbs," by W. C. Moore, reviewed, 42
 Distribution of Plants, 400
Docymia Delavayi, 120-1
 in flower, xxxi
 leaves and fruit, xxxxii
Doumeri, 121
Hookeriana, 121
indica, 121
rufifolia, 121
Draba imbricata, 81
 polytricha, 66
Dracocephalum palustre, 249
Stewartianum, 52
 at Kew, v
Vivid, 316
Drimys Winteri, 299
Drosanthemum micans, 117
Dryas Drummondii, 235-6
 x octopetala, 236
 integrifolia, 235-6
lanata, 236
 octopetala, 234-6
 minor, 236
 vestita, 236
or Mountain Avens, 234
Suendermannii, 236, 247
tenella, 236
tomentosa, 236
" Dwarf Trees," by S. Nozaki, reviewed, 193
- " Earth's Green Mantle," by S. Maughan, reviewed, 62
Ebenus cretica, 130, 162, 199
Echeveria elegans exhib., lvii
Echinodorus ranunculoides, 249
Edgeworthia papyrifera exhib., xlvi
 Edinburgh Royal Botanic Garden, 77, 82
Elaeagnus macrophylla, 307, 309
 pungens, 239, 246
Embothrium lanceolatum, 277
" Enigma of the Origin of Monstrosity and Cristation in Succulent Plants," by J. Verbeck Wolthuys, reviewed, 156
Enkianthus campanulatus, 170, 204
 pauciflorus, 277

- Enkianthus perulatus*, 316
japonicus, 169
Epacris ardentissima, 357
Epigaea asiatica, 211
Eranthis Tuberigeniana, 47, 66
Erica arborea alpina, 131
 at Wisley, xliv
australis, 107
canaliculata, 403
carnea, 48, 167, 307-8, 404
 King George, 48, 67
 praecox rubra, 48
 Queen Mary, 48
 Springwood White, 48, 67, 107
Vivella, 67, 107
cinerea, 200, 231
darleyensis, 48, 67, 107, 309, 358, 404
glauca elegans exhib., xl
lusitanica, 47, 48, 67, 107
mediterranea alba, 67
 Brightness, 67
 carnea, 307, 309
 hibernica, 48, 67
 superba, 67, 107
Pageana exhib., xliii
Stuartii, 200
terminalis, 200, 231, 271
Tetralix mollis, 200
vagans, 231, 271, 316, 358
Veitchii, 67
Erigeron pinnatisectus, 403
 speciosus Quakeress, 200
Erinacea Anthyllis, 25
 pungens, 81
Eriogonum rivale, 403
Eriophorum latifolium, 247, 249
Erythronium Dens-canis, 66
Escallonia Donard Seedling, 163
 macrantha, 94
Espeletia grandiflora, 289
Eucryphia cordifolia, 205
 glutinosa, A.G.M. 123, 170, 204, xxxi
 lucida, 204
 Milliganii, 204
 Moorei, 205
 Nymansay, 205, 277
 pinnatifolia, 123
Eulophia Rueppelii, A.M. 220, liv
Euonymus alatus, 167, 170
 Bungeanus, 168, 271
 europaeus, 94
 atropurpureus, 168
 oxyphyllus, 168
 pauciflorus, 168
 phellomanus, 208
 radicans, 27
 verrucosus, 271
 yedoensis, 168
Eupatorium Weinmannianum, 298
Euphorbia fulgens, 182, xxxv, xxxix
 heptagona, 117
 horrida, lvii
Examinations, 64, 105, 129, 161, 196,
 229, 401, vii
Exbury, The Home Wood, 111
Exhibits, small, 65
Exochorda Albertii, 97
 Korolkowii, 83, A.G.M. 97
Expeditions, v
- Fatsia japonica*, 307-8
Features of my Garden, 71, 111, 167,
 203
 "Feeding the People in War-time," by
 Sir J. Orr and D. Lubbock, reviewed,
 157
Feijoa Sellowiana, 297
Fenwick, M., on Autumn colour at
 Abbotswood, 167
Floral Clock, 289, 306
Flower and Vegetable trials, iv
 "Flowering Shrubs of California and
 their value to the Gardener," by
 L. Rowntree, reviewed, 158
Flowers, insect visitors, li
Food from the Garden, 146
 production, 227, ii
Forget-me-Not, Star of Zurich, 242
Weirleigh Surprise, 242
Forsythia Giraldiana, 48, 67
 gnaurs on, li
 intermedia, 67
 gnaurs on, xliv
 spectabilis, 94, 156
 ovata, 67
 suspensa, 67
 viridissima, 307-8
Forthcoming events, 5, 43, 63, 103, 127,
 159, 195, 227
Fothergilla major, 169
 monticola, 169, 170
Fragaria chiloensis, 257, 260, 329
 vesca, 329
 virginiana, 257, 329
 yellow edge susceptibility, 257-8
Fremontia californica, 300
Fritillaria citrina, 66
 crassifolia, 107
 glauco-viridis, 107
 pudica, 66
Frost, glazed, January 1940, 118, ***
 "Flower and Vegetable preserving and
 War-time Gardening," by J. Stoney,
 reviewed, 310
Fruit disease, better control, 6
 spray calendar, 361-2
 tree planting, 6
 Trials at Wisley, Commercial, v
 lessons from, 85, 183, 256
Fuchsia corymbiflora, 108, 130, 162
 magellanica, 315
 parviflora, 162, 315
 procumbens, 315
 serratifolia, 130, 162
 Tom Thumb, 51
Furnishing a new garden, 89
- Galanthus Elwesii*, 47
 globosus, xliv
 latifolius, 47, 66
 nivalis, 307-8
 Olgae, 315
Gall on Salix, xli
Garden, Features of my, 71, 111
 food from, 146
 furnishing a new, 89
 " Garden goes to War, A," by S.
 Cheveley, reviewed, 102

lxvi PROCEEDINGS OF THE ROYAL HORTICULTURAL SOCIETY.

- Garden, Home Wood at Exbury, 111
 Kitchen, 7, 48, 69, 109, 133, 165,
 201, 233, 359
 making from old pasture, 53
 Notes, 61, 74, 164, 326, 398, 421
 "Gardens of Character," by M. Cran,
 reviewed, 41
 Garden Poultry food from, 96
 vegetable, in January, 7
 "Gardening in War-time," by E.
 Graham, reviewed, 126
 "Gardening on Chalk and Lime Soil,"
 by R. Jackson, reviewed, 157
 "Gardens and Gardening," by F. A.
 Mercer and C. G. Holme, reviewed,
 102
 Gardeners, women, training in war-
 time, 402
Gasteria Baileyi exhb., lvii
Gaultheria cuneata, 170
laxiflora, 319
procumbens, 25, 27
 Shallot, 27
yunnanensis, 319
 at Edinburgh, 333
Gaylussacia brachycera, A.M. 220, lv
dumosa, 169
 General Meetings, xxxiv, xxxix, xlvi,
 l
 Genetics, International Congress, vi
Genista aethnensis, 200
cinerea, 163
dalmatica, 26
falcata, 107
hispanica, 94
lydia, 163
pilosa, 26
sagittalis, 26, 27
virgata, 163-4
Gentiana asclepiadea, 231, 271
cernua, 294
Farreri, 231, 271, 315, 358
gracilipes, 231, 271
heptaphylla, 140
ornata, 231, 271
pyrenaica, 294
saxosa, 231, 270
setulifolia, 140, xlvi
sino-ornata, 169, 271, 315-6, 358
praecox, 169
 "Genus Tulipa, The," by Sir A. D.
 Hall, reviewed, 265
Geranium Farreri, 163, 199
sanguineum, 199
sub-caulescens, 163
 Wallichianum Buxton's var., 271
Gerbera Jamesonii, 108, 130, 162, 252
viridiflora, 252
Gericke, W. F., "Complete Guide to
 soilless Gardening," 354
 Gilbert, S., 377
 and his Florist's Vade-Mecum, 384
Gilia californica, 162, 231
 Glasnevin Botanic Gardens, 333, 349
Gloriosa Rothschildiana, 199
Godetia Blue Pigmy, *H.C. 224
Celestial, *A.M. 224
Firelight, *A.M. 224
Maiden's Blush, *A.M. 223
Godetia Orange Glory, *A.M. 223
Thunderbolt, *H.C. 224
White Swan Improved, *H.C. 223
Godetias, dwarf, tried at Wisley, 223
 "Good Breakfasts," by A. Heath,
 reviewed, 157
 "Good Food without Meat," by A.
 Heath, reviewed, 156
Gooseberries, pruning, 360
Graham, E., "Gardening in War-
 time," 126
 Graft hybrids and chimaeras, 212, 237
Grape Alicante, 234
Barbarossa, 395
Black Hamburg, 397
Monukka, 396
Cannon Hall, 395
Gros Colmar, 397
Maroc, 397
Lady Downe's Seedling, 234
Muscat of Alexandria, 395
Syrian, 395
Trebiano, 395
White Tokay, 396
Grevillea acanthifolia, exhb., liii
Ground Cover, 23
 "Grow it Yourself," by P. Izzard,
 reviewed, 157

Halimiocistus Sahucii, 26
 Hall Lady, on different ways of cook-
 ing winter vegetables, 28
 on the Herb Garden, 142
 Hall, Sir A. D., on Compost-making for
 Gardens, 75
 on Garden Making from old
 Pasture, 53
 on How the Plant Breeder goes to
 work, 283, 326
 on the Glazed Frost of January,
 1940, 118
 "The Genus Tulipa," 265
Hamamelis japonica, 48, 231, 316
mollis, 48, 93, 113, 169, 299, 307-8,
 358
 Harrow, R. L., on A few herbaceous
 Plants recently introduced to
 Gardens, 50
 Hatshopsitu, Queen, originator of first
 recorded plant hunting expedition,
 332
 Haworth-Booth, M., on the Garden
 Hydrangeas, 388
 Haworthia margaritifera, 116-7
 Hay, R. E., on an early Book on alpine
 Plants, 153
 on Pansies of Yesterday, 84
 Hay, T., on Daphne Sophia, 150
 on Hogg and Emmerton on the
 Auricula, 13
 Headfort, The Marquess of, iv
 Heath, A., "Good Breakfasts," 157
 "Good Food without Meat," 156
Hedychium Gardnerianum, 232
Heeria elegans, 199
Helenium autumnale Moerheim Beauty,
 200
Canadense, 347

- Helenium tuberosum esculentum*, 381
Helianthemum vulgare, 26
Helianthus annuus, 338-9, 346, 378-82
 tuberous, 338, 345-8, 376-7, 379,
 381, 382-3
Heliopsis gigantea, 50, iv
 scabra, 272
Heliotropium Indicum tuberosum, 347,
 379
Helleborus corsicus, 47
 foetidus, xli
 niger, 307-8
 x nigericors, 47
 vesicarius, xli
 E.K.B. 2125 exhib., xlii
Hepatica species, 410
 "Herb Garden, The," 142
Herbaceous plants recently introduced,
 50
Heterodera schachtii
Hibbertia dentata, 108
 volubilis, 108
Hibiscus syriacus, 395
Higgins, Vera, on "An Early Book on
 Succulent Plants," 115
Hill, J., "Wild foods of Great Britain,"
 310
Hippeastrum Ackermannii, 352
 Elizabeth Cartwright exhib., xlvii
 John exhib., xlvii
Hippophae rhamnoides, 316
Hoheria lanceolata, 298
Holly, fasciated, lvi
 variegation, 246
Holme, C. G., *see* *Mercer, F. A.*
Hoof and horn, beetles in, li
Horticultural Societies, local, 5
Houttuynia cordata, 249
 "How to Grow Garden Food," edited
 by A. W. Yeo, reviewed, 126
Howard, E. L., "Children's Gardens,"
 157
Huxley, J., Editor "The New System-
 atics," 193
Hyacinthus ciliatus, 307-8
 orientalis, 47, 66
Hydrangea arborescens, 205
 grandiflora, 206
 aspera, 206
 hortensis, 388
 involucrata, 206
Lindleyi, 207
 macrophylla (*opuloides*), 271, 377,
 388-9, 390
 macrosepalia, 377, 389
 maculata, 389
 Mariesii at Kew, 377, 389
 nigra, 389
 normalis, 377, 389
 wild form, 377,
 opuloides, 206-7, 388
 Mariesii, 206
 lilacina, 206-7
 nigra, 206
 paniculata, 206, 307-8
 grandiflora, 94, 231, 271
 peltiolaria, 206
 quercifolia, 206, 231
 Sargentiana, 206
Hydrangea scandens, 207
 serrata, 231, 390
 acuminata, 390
 sterile, 390
Grayswood, 390
intermedia, 377, 390
pubescens, 390
rosalba, 207, 390
stellata, 390
Wizzenboss, 390
Thunbergii, 390
vestita, 206
villosa, 206
Hydrangeas, the garden, 388
Hydrocleys Commersonii, 249
Hylander C. J., "The World of Plant
 Life," 42
Hypericum calycinum, 27, 94
 patulum, 94, 200, 231
 Forrestii, 231, 358
 prolificum, 231, 271
Hypoxis villosa, 315
Hypseocharis pedicularifolia, 290
Iberis sempervirens, 357, 403
Ilex glabra, 316
Indigofera pendula, 420, *Lxxix*
Inula ensifolia, 307-9
Iris Blue June (b), *A.M. 261
 Brahmin (b), *A.M. 262
 Calixa (b), *A.M. 262
 Chamaeiris, 107, 131
 Cheorio (b), *A.M. 263
 Douglasiana, 163
 Golden Hind (b), *F.C.C. 264, 368,
 375
 lactea (Pallas) exhib., lvii
 Mei hior (b), *A.M. 263
 Picador (b), *A.M. 263
 reticulata Cantab, 47
 Ruahine (b), *A.M. 262
 Sari, 107, 131
 Sierra Blue (b), 253
 stylosa, 46
 tectorum, 163
 unguicularis, 46, 307-8
 White City (b), 261, *F.C.C. 304
Irises, bearded, tried at Wisley, 261
 tall bearded, of yesterday and to-
 day varieties, 363-375
Izzard, P., "Grow it Yourself," 157
Jackson, R., "Gardening on Chalk and
 Lime Soil," 157
Jasminum humile, 298
 nudiflorum, 46, 93
John, H., "The Skeptical Gardener,"
 194
 Innes Leaflets Nos. 1, 2 and 3, re-
 viewed, 265
Juniperus drupacea, 25
 procumbens, 26, 27
Kakothrips pisivorus, 410
Kale, Labrador exhib., xli
Kalmia latifolia, 163
 polifolia, 183
Kalmiopsis Leachiana, 182

lxviii PROCEEDINGS OF THE ROYAL HORTICULTURAL SOCIETY.

- Keeble, Sir F., "Science lends a hand in the Garden," 41
 Kitchen garden, 7, 48, 69, 100, 133, 165, 201, 233, 273, 317, 359, 405
Kolkwitzia amabilis, 207
Krapfia Raimondii, 138
- Laburnum Vossii*, 94
Laccopetalum giganteum, 137, xlvi
Lachenalia Nelsonii, 119, xl
Laelia superbiens, 393
Laeliocattleya × New York, Illimani, A.M. 151, xl
 × Orange Beauty, A.M. 189, xviii
Lapageria rosea, 232, 272, 315, 367
 Large, E. C., "The Advance of the Fungi," 421
 Lateral growth, thickened, xli
 Laurie, A., "Soilless Culture Simplified," 264
Laurus nobilis, 142
 Lawrence, W. J. C., on the Genus *Streptocarpus*, 17
Lecanium hesperidum, lvi
 Lecturers, Panel of, 46, 65, 105, 129, 195, 227, 268, 312, 356, vi
Leptinotarsa decemlineata, 416
Leptochiton quitoensis, 290
Leptospermum scoparium eximium, A.M. 122, xxxvi
 Lettuce, Arctic exhib., xli
 King, 233, 273
 Commodore Nutt exhib., xli, lli
 Feitham King, 317
 Golden Ball exhib., xli
 Imperial, 233, 273
 May Queen, 317
 Stanstead Park, 273, xli
Leucogenes grandiceps, 403
Leucojum vernum Vagneri, 47, 66
Leucopogon Fraseri, 27
Lewisia brachycalyx, 81
 Library, in the Lindley, 84, 115, 153, 384
 Lindley, 45, 65, 129, 229, vi
Ligustrum ionandrūm, 421
Quihoui, 307, 309
 sinense, 120
Lilium candidum, li
Duchartrei, 199
 giganteum, 276
 Henryi, 271
 × Kulshan, 276
 × Maxwill, 276
 × princeps, pink form, 277
pyrenaicum, 163
regale, 135, 199
 bulb, abnormal growth, li, lli
rubellum, 163
 at Wisley, xlvi
 × Shuksan, 276
speciosum, 271
 × Star of Oregon, 276
superbum, 231, 271
Szovitsianum, 163, 199
tigrinum splendens, 231
umbellatum, 163
Willmottiae, 199
- Lily bulb, abnormal growth, li, lli
 group, 44, 64, 104, 129, 161, 196, iv
Limnanthes Douglasii, li
Limonium insigne (*Statice insignis*), 141
 (*Statice*) *ornatum*, 231, 270, 315
rosea, 232
Linaria crassifolia, 199
Linnaea borealis, 27
Liquidambar styraciflua, 169, 358
Liriodendron tulipifera, 358
Lithospermum diffusum erectum, 163
 prostratum, 25, 26, 27, 307–8
 erectum, 107
rosmarinifolium, 46, 315, 357, 403
Lloydia graeca, lli
Lobelia fulgens, 230, 232, 270
 Long, B. R., on Tall bearded Irises of yesterday and today, 363
Lonicera fragrantissima, 93
japonica Halliana, 93
Maackii, 421
nitida, 93
yunnanensis, 93
splendida, 162
Standishii, 93
Loropetalum chinense, 47, 68
 Lubbock, D., *see* Sir J. Orr
Luculia Pinceana, 47
Lupinus alopecuroides, 289, 294–5
 Iycaste, Sir Jeremiah Colman, xxxii
Lychnis Haageana, 199
Lyonia (Pieris) Mariana, 316, 358
- Macleania insignis*, 130
Magnolia acuminata, 207
Campbellii, 72, 140, 207
conspicua, 71, 72
cordata, 203
Dawsoniana, 72, 207
Delavayi, 74, 207
denudata, 71, 207
globosa, 73
grandiflora, 73
 Goliath, 73
hypoleuca, 73, 207
Kobus, 67, 71, 108, 207
borealis, 71
Lennei, 207
mollicomata, 72
nitida, 74
obovata, 73
officinalis, 207
parviflora, 73, 207
 semiplena, 73
rustica rubra, 207
salicifolia, 71, 207
Sargentiana, 72, 73, 207, 219
 robusta, 73
Sieboldii (*parviflora*), 163
sinensis, 73, 207
Soulangiana, 94, 108
Brozzonii, 72
Lennei, 71
rustica, 71
Sprengeri diva, 72
stellata, 71, 94, 207
rosea, 71



Photo N. K. Gould;

FIG. 112.—*CAMELLIA JAPONICA MAGNOLIAFLORA* AT WISLEY.
(See p. 403)



Photo N. K. Gould

FIG. 113.—*CLEMATIS CIRRHOSA* AT WISLEY.
(See p. 403.)

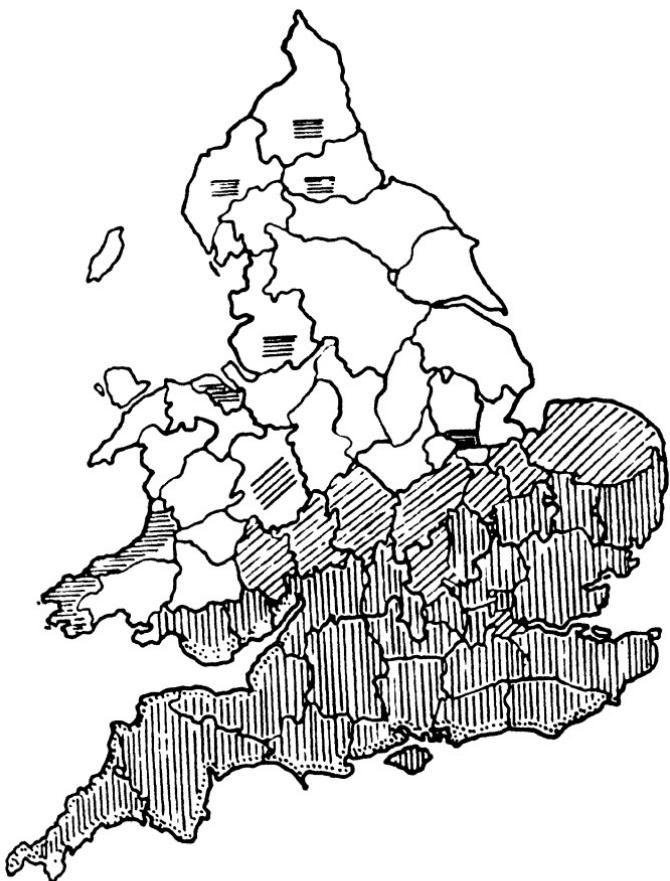


FIG. 114. DISTRIBUTION OF THE CABBAGE WHITE FLY, *Aleyrodes brassicae*, IN ENGLAND AND WALES

- Generally abundant and destructive.
- |||||| Occasionally abundant and destructive
- ||||| Fairly abundant but rarely destructive
- Rarely found and never epidemic.

(See p. 409.)

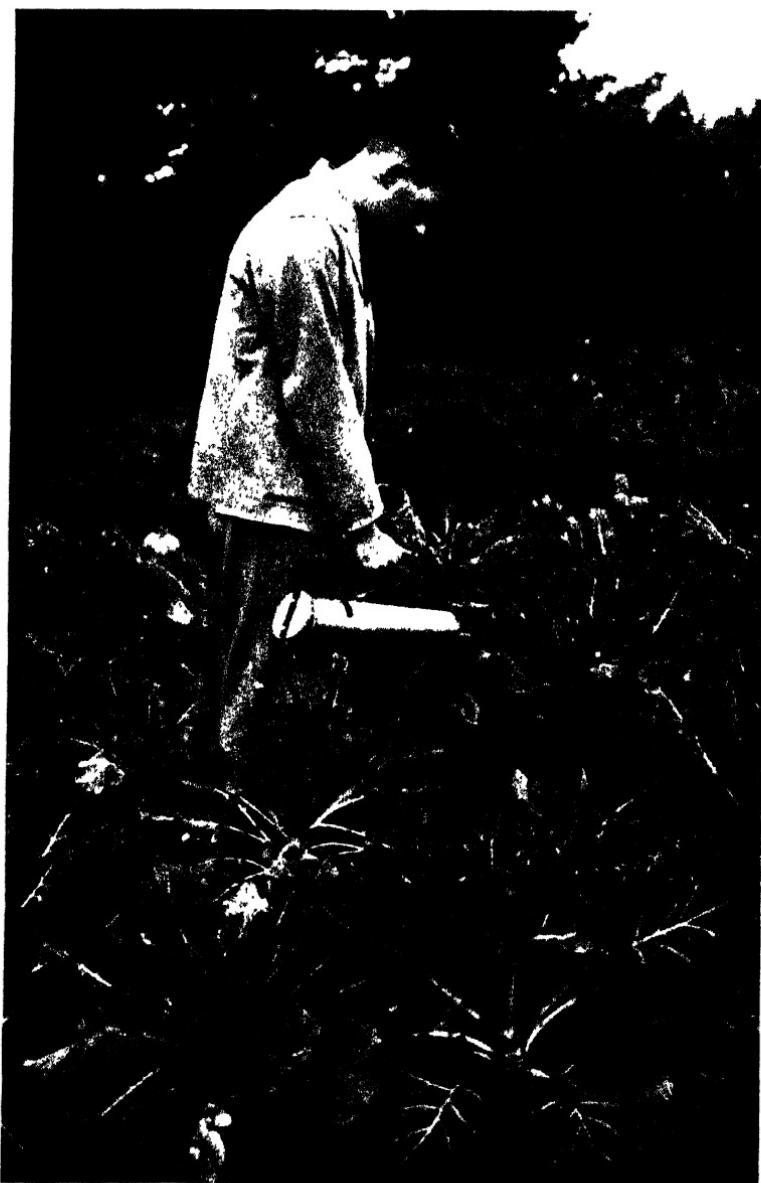


FIG. 115.—APPLYING NICOTINE DUST WITH A SHAKER BLOWER TO CONTROL
MEALY CABBAGE APHIS ON BRASSICAS.
(See p. 414.)



FIG. 116 — APPLYING AN ARSENICAL WASH THROUGH A CONTINUOUS SPRAYING MACHINE FOR CONTROLLING PEA-WEevil.

(See p. 417)



FIG. 117. "BLOATED" ONIONS DUE TO AN INFECTION OF BULB EELWORM,
Anguillulina dipsaci
(See p. 411)



Photo N. K. Gould

FIG. 118 - INDIGOFERA PENDULA AT WISLEY
(See p. 420.)



Photo R. M. Adam]

FIG. 116. RHODODENDRON RUGOSUM AT EDINBURGH
[See p. 421]

- Magnolia tripetala*, 207
tsarongensis, 73
Veitchii, 72
Watsonii, 73, 163, 200, 207
Wilsonii, 73, 207
- Magnolias* at Bodnant, 71
- Mahonia japonica*, 47, 403
lomariifolia, 404
- Malus baccata*, 271, 316
coronaria, 170
Eleyi, 95, 108, 132
floribunda, 108
atrossanguinea, 95
x Hartwigii exhb., liv
hupehensis, A.G.M. 187, xliz
rosea, 108, 188
- ioensis plena*, A.M. 220, 253, lvii
- Lemoinei*, 95
- micromalus* exhb., liv
- purpurea*, 95, 108
- Sargentii*, 271, 316
- Simcoe*, A.M. 220, liii
theifera, see *M. hupehensis*
- toringoides*, 95
- Mamestra brassicae*, 414
- Mandevilla suaveolens*, 272
- Mangham*, S., "Earth's Green Mantle," 62
- Manure, hoof and horn, beetles in, li
- Martin, H., "Scientific Principles of Plant Protection" 266
- Masters Memorial Lectures, 212, 237, xliv
- Meconopsis betonicifolia*, 135, 163
superba, A.M. 220, lvii
- Meeting, Annual General, xxiv
General, xxxiv, xxxix, xlvi, li
- Megachilum purpureorachis*, liv
- Meliosma Veitchiorum*, 208
- Mentha rotundifolia*, 144
- Menyanthes trifoliata*, 249
- Menziesia ciliicalyx* exhb., xviii
- Mercer, F. A., and C. G. Holme, "Gardens and Gardening," 102
- Mesembryanthemum graniforme*, 116
- Messel, Lt.-Col. L. C. R., on Nyman's, 203
- Middleton, C. H., General Editor, "Wartime Allotments, Pigs and Poultry," 126
- Mimulus cardinalis*, 231
- Mitchella repens*, 25, 26, 27
- Monarda didyma Cambridge Scarlet*, 232
- Montbretia Lady Wilson, *A.M. 27
Princess Mary, *H.C. 27
R. C. H. Jenkinson, *A.M. 27
The Hon. Mrs. Edwin Montague, *H.C. 27
- Moore, W. C., "Diseases of Bulbs," 42
- Morchella esculenta* exhb., iii
- Mosaic disease, 243, 256
- Muehlenbeckia complexa*, 297
- Mulligan, B. O., on *Berberis chrysophylla* from Tibet, 281
on *Chrysanthemum (Leucanthemum) demnatense*, 353
on *Dociyna Delavayi*, 120
on *Indigofera pendula*, 420
- Mulligan, B. O., on *Paeonia L'Espérance*, 398
- on *Rosa macrophylla Korolkowi* 284
on some Tibetan Rosa species collected by Kingdon Ward, 56
- Mutisia decurrens*, 162, 199
viciaefolia, 292
- Myosotis Dolly Thorne* exhb., lvii
palustris, 249
- Myrtus communis*, 297
- Nandina domestica laciniata* exhb., xlivi
- purpurea* exhb., xlivi
- Narcissus Aranjuez*, A.M. 151, xlvi
- Argyll* exhb., xlvi
- asturiensis*, 47, xlvi
- Blarney* exhb., xlvi
- Bonython* exhb., xlvi
- Bravura* exhb., lv
- Bulbocodium*, 106
- Calchas* exhb., xlvi
- Carbineer*, A.M. liv
- Carnlough* exhb., xlvi
- Cherie* exhb., lv
- Chinese White*, P.C. lv
- Constantine* exhb., xlvi
- Content*, A.M. 189, xlvi
- cyclamineus*, 67, 107
double, virescent, xlvi, li, lii
- Dervish*, A.M. 190, xlxi
- Elgin*, A.M. 190, xlxi
- eystettensis*, lii
- Fairy King* exhb., xlvi
- Fortune's Bowl*, A.M. xlvi
- Golden Spur*, 303
- Green Island*, xlvi, P.C. xlvi
- Grey Lady*, A.M. 226, lv
- Jill* exhb., li
- Kanchenjunga*, A.M. 190, xlvi
- Killaloe*, P.C. xlvi
- Ludlow*, F.C.C. 221, xlvi
- Mahmoud*, P.C. xlvi
- Marentha*, xlvi
- Marion Cran*, for trial at Kirton, lii
- Marvieri*, A.M. 151, xlvi
- nanus*, 66, 106
- Narvik*, P.C. xlvi
- Orange Bird, lii
- Orange Splendour, lii
- Poland* exhb., li
- pumilus*, twin-flowered, xlvi
- St. Keyne, A.M. 190, xlvi
- Saltash*, P.C. lii
- Samite*, F.C.C. liv
- Silver Wedding* exhb., lv
- Sincerity*, F.C.C. liv
- Smyrna* exhb., lv
- Soleil d'Or*, 303
- Swansdown*, P.C. lv
- Tramore*, P.C. xlii
- Trewirgie* exhb., xlvi
- triandrus*, 131
Hawera, 131
- Truth*, A.M. 191, xlvi
- Watieri*, 66
- Winkfield's Dower*, A.M. 191, xlvi
- Nepeta Stewartiana*, 52

LXX PROCEEDINGS OF THE ROYAL HORTICULTURAL SOCIETY.

- Nerine Bowdeni, 169
 flexuosa, 272
 Nertera depressa, 26, 27, 231, 270, 315
 Nesaea verticillata, 249
 "New Systematics, The," edited by J. Huxley, reviewed, 193
 "News of Persephone," by D. U. Ratcliffe, reviewed, 102
 Nicotiana glutinosa, yellow mosaic, 244, 246
 Niptus holosericeus, li
 Nomenclature of Phyllodoce empetrifoliae, 326
 Nothofagus antarctica, 208
 betuloides, 208
 cliffortioides, 207
 Dombeysi, 208
 fusca, 207
 Menziesii, 207
 obliqua, 208
 procera, 208
 pumilio, 208
 Solandri, 207
 Notholirion Thomsonianum, 155
 Nozaki, S., "Dwarf Trees," 193
 Nuphar luteum, 137
 Nymans, 203
 Nymphaea Aurora, 249
 chromatella, 248
 Escarboucle, 249
 Gonnère, 248
 Graziella, 249
 Moorei, 248
 odorata maxima, 248
 William Shaw, 249
 Paul Harot, 249
 Rose Nymphe, 249
 Sunrise, 249
 Nyssa sylvatica, 169
- Obituary, ii
 Odontioda x Astoria, Gloria, A.M. 151, xl
 x Saxa, A.M. 122, xxxvi
 Zeta exhb., xl, xliii
 Odontoglossum Bonzo exhb., xl
 x Perryanum, xxxvi
 x Phantasy, East Burnham var. A.M. 221, liv
 Odontonia Olga, 110
 x Poinesta, F.C.C. 122, xxxvi
 Oenothera Lamarckiana, li
 "Old-fashioned Flowers," by S. Sittwell, reviewed, 41
 Omphalodes Luciliae, 81
 verna, 307-8
 Omphalogramma Elwesianum, 140
 Onom, Autumn Triumph, 233
 White Lisbon, 233
 Ophrys ? atrata exhb., xliv
 Opuntia curassavica, 116
 Orange, Bizzaria, 212-3
 shoots, Lecanium hesperidum, attack, li
 Orchid from Italy, li
 Orchis foliosa, 199
 mascula, li
 olbiensis, xlviii, li
- Origanum Onites, 144
 sibiricum, 307-8
 Orontium aquaticum, 250
 Orphanidesia gaultherioides, 210, 211, lv
 Orr, Sir J., and D. Lubbock, "Feeding the People in War-time," 157
 Orwin, C. S., on Experiences with some Wall Shrubs and Climbers, 296
 Osmanthus Aquifolium, 358
 Delavayi, 106, 207
 Oxalis Bowiei, 232, 272, 315
 magellanica, 231, 271
 Oxydendrum arboreum, 169, 316, 358
 Oxypetalum caeruleum, 162, 199
- Paeonia Cambessedesii, 68
 coriacea exhb., liii
 Delavayi, lvi
 Lemonnei L'Espérance, 378, 398
 lutea, 398, lvi, lvii
 x Delavayi, lvi, lvii
 Moutan, 398
 Potaninii lvi
 trollioides, lvi
 suffruticosa, 398
 trollioides, lvi, lvii
 Pansies of Yesterday, 84
 Pansy, Allen's John Bull, 83
 Iver Hero, 85
 Lamb's Mountaineer, 85
 Masterpiece, 83
 Mountjoy's Beauty of Ealing, 83, 85
 Thompson's King, 85
 Victoria, 83
 Parnassia nubicola, 271
 Parochetus communis, 27
 Paronychia nivea, 199
 Parrotia persica, 169
 Passiflora edulis, 272
 foetida, 292
 Paulownia imperialis, 395
 Pea, culinary, Climax, *C. 98
 Comet, *H.C. 98
 Gilt Edge, *A.M. 99
 Splendour, *A.M. 99
 Steadfast, *A.M. 99
 plant weevils, control, lii
 Pear Basiner exhb., lii
 Jargonelle, pruning, 360
 Josephine de Malines, pruning, 360
 leaf, lv
 Pear-Quince, 215
 leaf, lv
 Peas, culinary, tried at Wisley, 98
 Peckham, E. A. S., Editor "Alphabetical Iris Check List," 354
 Pelargonium Carmine, A.M. 191, xlviil
 Escot, 242
 Freak of Nature, 230, 241
 Madame Salleron, 241
 Regal, 242
 Schottii, 199, 272
 variegation, 238, 239
 Peltandra alba, 250
 Penstemon Menziesii, 25
 Newberryi, 131
 Pentapterygium serpens, 130

- Pentstemon*, *see* *Penstemon*
Pernettya leucocarpa, 26
 mucronata, 25, 26, 170
 pumila, 26
Perry, F., on The Water Garden, 245
Pests and Diseases of Vegetables, Bull., 198, 130
Pfeiffer, E., "Bio-dynamical Farming and Gardening," 310
Phalaenopsis amabilis, 393
Phaseolus vulgaris, 123
Philadelphus Avalanche, 94
 Belle Etoile, 94
 Boule d' Argent, 94
 Favourite, 94
 microphyllus, 94
 Mont Blanc, 94
 sp., 421
 Virginal, 94, 200
Philesia buxifolia, 277
Phlox adsurgens, 27
 mesoleuca, 162
Photinia Beauverdiana, 170
 villosa, 160, 208
Phygelius aequalis, 51, *iv*
 capensis, 51
Phyllodoce Breweri, 74
 empetrifloriformis, 74, 326
 hybrida, 74
 x intermedia Fred Stoker, 326
 nomenclature of the Genus, 74
 pseudoempetrifloriformis, 74, 326
Phyllostreta species, 410
Physostegia virginiana intermedia
 rubra, 50, 232
 Vivid, 50, 272
Phytalephas macrocarpa, seeds, xxxix
Picea Morinda (*Smithiana*), 203
Pieris brassicae, 278, 414
 rapae, 414
Pieris elongata, 277
 floribunda, 67
 japonica, 67, 204
 taiwanensis, 67
Pimelea ferruginea, 162
Pinks, trial, 228, 269
Pinus Gerardiana, *sibirica*
 leiophylla, 351
 Montezumae, 351
 patula, 351
 Pseudo-strobos, 351
Piptanthus nepalensis, 208
Pirocydonia Danieli, 215
Plagianthus Lyallii, 298
Plant Breeder, how the, goes to work, 283, 326
 introduction, first record, 334
 "Plant Physiology," by M. Thomas, reviewed, 42
Plants to Come, 135
Plants to keep in mind, 52, 217, 353
 "Plants with Personality," by P. M. Syng, reviewed, 101
Pleroma macranthum, 357
Plums, pruning, 360
Polemonium pulcherrimum exhb., lvi
Polygala Vayredae, 131
Polygonum affine, 358
 panciculatum, 200
Pomaderris apetala, 47
 elliptica, 68
Pontederia cordata, 247, 250
Populus canadensis aurea, 167
 graeca pendula, 119
 tremuloides pendula, 119
Potato Golden Wonder, 242-3
 Langworthy, 243
Potentilla fruticosa, 94
Potter, J. M. S., on Lessons from the Wisley Fruit Trials, 85, 183, 256
 " Poultry Food from the Garden," 96
Prenia pallens, 117
Preston, F. G., on Cambridge University Botanic Garden, 171
 G. H., on *Dracocephalum Stewartianum*, 52
 G. H., on *Dryas* or Mountain Avens, 234
 G. H., on Plants to keep in mind, 52
Primula Agleniana, 137
 Allionii, 66, 107, xliv
 alpicola, 199
 Auricula, 307-8
 chionantha, 106, 131
 chunglenta, 163
 denticulata, 107, 131, 155
 at Wisley, *xliv*
 Rose Queen exhb., xliv
Dubernardiana, 66
Edgeworthia exhb., lvi
Elwesiana, *see* *Omphalogramma Elwesianum*
 Faldonside, 107
 floribunda, 286
Florindae, A.G.M. 60, 61, 200, *iv*
 helodoxa, 131, 163
 hyacinthina exhb., lvi
 japonica, 131
 kewensis, 286 329
 limnoica exhb., *xlvi*
 Littledalei exhb., 1
 Madame de Pompadour, 385
 malacoides, 47, 68
 Aubrietia, *see* *P. malacoides* *Lilac Queen*
 Charming, for trial, *xxxx*
 Dignity *A.M. 151, *xxxv*
 double forms, 119
 Lilac Queen, for trial, xl
 Loveliness exhb., *xxxv*
 Majestic exhb., *xxxv*
 Mauve Queen, *H.C. 152, *xxxv*
 Simplicity for trial, *xxxv*
 marginata, 66, 107
 rosea exhb., *xlvi*
 Mrs. J. H. Wilson, 107
 nutans, 131
 obconica, *xlvii*
 Palinuri, 68
 pubescens Rae Berry exhb., *xlvi*
 pulverulenta, 131, 163
 Purple Wanda, for trial, *xlvii*
 Red Hugh, 131, 163
 redolens, 107, 131
 rosea, 106
 scapigera, 182
 Sieboldii, 106, 131

- Primula sinensis* Dazzler, 332
 x Duchess, 332
 Double Charm, *A.M. 152, xxxv
 Scarlet King *A.M. 152, xxxix
stellata Guardsman, for trial,
 xxxix
 types of leaf, 288
sonchifolia, 82, 181, xliv
szechuanica advena exhb., lvi
veris, 385
verticillata, 286
viscosa alba exhb., xlvi
 White Wanda, for trial, xlvi
 Wintern, 403
 hybrid 182
Zenobia exhb., lvi
 "Propagation of Horticultural Plants,"
 by G. W. Adriance and Prof. F. R.
 Brison, reviewed, 42
Prostanthera rotundifolia, 68, 108
 Sieberi, 108, A.M. 191, xlv
Prunus Amanogawa (erecta), 95
cerasifera Pissartii, 67, 95
 nigra, 67
communis, 95
 macrocarpa, 95
 Pollardii, 95
Conradinae semi-plena, 48, 67
Davidiana alba, 95
 Fugenzo (J. H. Veitch), 95
 x Hillieri exhb., xviii
incisa, 68, 95, 107
 Okumiyako (longipes), 95
Pandora exhb., xviii
 Pissartii, 114
 pumila, 169
 Saki-yuma (Hizakura), 95
 Sargentii, 107, 167, 271
subhirtella, 170
 ascendens, 95
 autumnalis, 94, 358, 404
 pendula 132
 at Wisley, xlvi
tomentosa endotricha rosea exhb.,
 xviii
triloba, A.G.M. 97
 at Edinburgh, 82
 plena, 95
 yedoensis, 107
Psila rosae, 410, 418
Pteridophyllum racemosum, 82
 Publications, 197, 269, 313, 356, 400,
 vi
Pulmonaria angustifolia, 67, 106
Punica Granatum, 299
Puya gigantea, 289
Pyracantha Rogersiana, 93
Pyrethrum May Day exhb., lvii
Pyrus arbutifolia, 168
 Delavayi, 121
 indica, 121
 ussuriensis, 107

Quercus coccinea, Knaphill var., 169
 splendens, 358
 mariandica, 170
 palustris, 170
Quince leaf, lv

 Radish Scarlet Globe exhb., lli
 Raftill, C. P., iv
Raniondia Myconi (pyrenaica), 131
 Nathaliae, i
 Ramsbottom, J., "A Book of Roses,"
 101
Ranunculus calandrinioides, 66
 giganteus, 137
Lingua grandiflora, 256
 Lyallii, 137
 Raimondii, 138
Raoulia australis, 26
Raspberry Lloyd George, 274
 Ratcliffe, D. U., "News of Perse-
 phone," 102
Red Cross Sale, 127, 159, 196, 227, 267,
 311-12, 401
 books in, 275
 plants in, 276
Rhododendron Albrechtii exhb., 1
 Androclies exhb., xlvi
 arborescens, 200
 arboreum, 77, 111
 Ascot Brilliant, 111
 aunculatum, 112
 hybrids, 200
 azaleoides, 163
 Bagshot Ruby, 112
 barbsutch exhb., xlvi
 B. de Bruin, 112
 Betty, *A.M. 304
 x Biskra, A.M. 221, lv
 Bodartianum, 111
 Bntannia, 111, 114
 burmanicum, 68
 Butterby, *A.M. 304
 calophytum, 113
 Calrose, 88
 x Calthom exhb., 1
 campanulatum Knap Hill form, 112
 x Campxen exhb., lv
 campylocarpum, 112
 hybrids, 113
 campylogynum, 131
 chameunum, 106
 Chaste, 88
 x China, A.M. 221, lv
 Christmas Cheer, 111
 chrysanthum, xlvi
 cilicayx, 68, 108
 cilpinense, 66
 x Cho exhb., 1
 (a) coccinea speciosa, 113
 conference, iv
 x Cornish Cream exhb., lv
 Countess of Haddington, 68
 x Cremorne exhb., lv
 x Cretonne, A.M. 221, lv
 Daimio, 114
 Dalhousiae, 77, 140
 x Day Dream, A.M. 222, lv
 decorum, 77, 131
 Devriesianum, 139, xlvi
 discolor, 114
 hybrids, 200
 Dr. M. Oosthoek, *A.M. 305
 Doncaster, 112
 Earl of Athlone, 112
 Electra, A.M. 222, lv

Rhododendron Elisabeth, 88
 x Elsae, Clyne, A.M. 191, xlvi
 x Ethel, F.C.C. 192, xlvi
 Euridice, 88
 x Exminster, Little Paddocks var.
 exhb., 1
 x Fabia, Tangerine, A.M. 222, lvii
 Falconeri, 113
 x R. eximium exhb., xlvi
 Fargalo exhb., xlvi
 x Farola exhb., 1
fastigiatum, 218
ferugineum, 81
 Gaul, 88
 Gay Gordon, 88
 Geisha, 88
 Gibraltar, 88
giganteum, 77
 Gill's Crimson, III
 Gipsy King, 88
 Glamour, 88
 (a) Gloria Mundi, 113
 Goblin, 88
 Golconda, 88
 Golden Horn, 88
 Good Cheer, 88
 Grace, 88
 x Grand Prix, A.M. 192, xlvi
 grande, 77
 x R. Falconeri exhb., xlvi
 Grenada, 88
 Grenadier, 88
 Grenadine, 88
 Grierocaster, 88
 Griersonianum, 77
 x R. Kingianum exhb., lv
 Griffithianum, 77
 Grissette, 88
gymnocarpum, A.M. 222, lv
 Hampreston, 88
 Helen Schifner, 111
 Vandevere, 88
 (a) H. H. Hunnewell, 113
 hybrids, new, 88
impeditum, 106
indicum balsaminaeflorum, 163
intricatum, 106
 Ivery's Scarlet, 112-3
 (a) *japonicum*
 Brilliant Red, 113
 Clara Butt, 113
 Floradora, 113
 J. C. Van Thol, 113
 Jaquette, 88
javanicum, 139
 J. G. Millais, 112
 Jock, 88
 John Cairns, *A.M. 305
Johnstoneanum, 108
 Juliana, 88
Kaempferi, 114
 (a) Kurume Hinomayo, 113
 Lady Chamberlain, 130
 Clementine Mitford, 112
 E. Cathcart, 111
 Stair, 88
Leachianum, 183
 (a) *leditolum*, 112
leucaspis, 66

Rhododendron Little Bert, 88
Lodauric, 88
Loderi 112, 118
 King George, 218
 Pink Diamond, 218
 x R. x Mrs. Messel exhb., lv
Loder's White, 114
 L. R. Number 539 exhb., lv
lutescens, 67, 114
luteum, 210
Magoranum exhb., lvii
Matador, 88
 x Maya, A.M. 152, xli
Merops, 88
Mikado, 114
mishmiense, A.M. 192, xlvi
 Mrs. George Paul, 112
 G. W. Leak, 111
 J. C. Williams, 112
 Lionel de Rothschild, 113
 P. D. Williams, 111
Mother of Pearl, 112
moupinense exhb., xlvi
mucronatum, 131
mucronulatum, 113
Nuttallii, 77
obtusum, 131
 (a) *occidentale* hybrids, 113
Oldhamii, 108
 x *Oreocinn* exhb., lv
 Peggy, *A.M. 305
Pink Pearl, 112
ponticum, 210
praecox, 113
 x *praecox*, 67
praevernum, 113
Princess Elizabeth, 112
prophantum, 77
pumilum exhb., xlvi, 1
Purple Splendour, 112
Pygmalion, 112
Queen Wilhelmina, 114
racemosum, 106, 421, *Iris*
Red Rover, 88
 Star, *A.M. 305
Redstart exhb., xlvi
repens, 135
rhabdotum, 77
 (a) *rosaeflora*, 163
Rosefinch, 88
Rosy Dawn, 88
scintillans, 106, 218
Sea Nymph, 88
 x *Seagull*, *Seamew*, A.M. 192, xlvi
semnooides, F25630 exhb., xlvi
Shilsoni, 113
 species No. 1—with F21736 exhb
 xlvi
 species No. 2—with F20333 exhb.
 xlvi
stenaulum (F26418) exhb., xlvi
 (a) *stricta glauca*, 114
 x *Sulfmeg*, A.M. 192, xlvi
Surprise, J. E. Harris exhb., 1
sutchuensis, 113
 Giraldii, 113
 x R. Loderi exhb., 1
Sweet Simplicity, 112
 x *Taranto* exhb., 1

- Rhododendron \times Thomwilliams exhb., 1
 velleereum, F25646 exhb., xlvi
 F25047 (?) exhb., xlvi
 \times Venapens exhb., 1
 villosum exhb., lvii
 (a) viscosum, 114, 203
 Watsonii exhb., 1
 \times White Glory, Pink Glory, A.M.
 192, 1
 \times White Knight exhb., lv
 Wings, 88
 Winsome, 88
 yunnanense, 114
- Rhododendrons at Edinburgh, 82
 new hybrids, 88
- Rhodothamnus Chamaecistus exhb.,
 xiii
- Rhus cotinoides, 169
 Cotinus, 169
 atropurpureus, 358
- Potanini, 168
- Toxicodendron, 169
- typhina laciniata, 169
- Ribes americanum, 167
 aureum, 271
 sanguineum, 94
 atrorubens, 94
 King Edward VII, 94
 splendens, 94
- Ricinus Americanus, 382
- Robinson, G. W., on the Chelsea Physic Garden, 8
- Roechea coccinea, 116
- Rosa Alberti, 57
 altaica, 203
 Banksiae, 388
 Biondii, 57
 bracteata, 270
 Brunonii, 56
 Cantab, xxxiii
 caudata, 57
 cinnamomea Korolkowi, 254
 Davidii, 56, 57, 200, 272
 elongata, 56
 Dupontii, 209
 Ecae, 57
 Ernestii, 376, 387
 Fedtschenkoana, 57
 filipes, 387-8
 foetida, 386
 francofurtana, 386
 hemisphaerica, 386
 Hugonis, 132
 indica semperflorens, 209
 Korolkowi, 254
 longicuspis, 209
 lucida nitida, 204
 macrantha, 209
 macrophylla, 254-5
 Korolkowi, 254-5
 hirsuta, 247
 moschata, xlvi
 var., 209
- Movesii, 56, 58, 208, 272
 multibracteata, 200
- Mundi, 277
- Murielae, 57, 58
- nitida, 170
- nivea, 209
- Rosa nutkana \times R. Red Letter Day,
 xxxiii
 omeiensis, 132
 oxyodon, 232, 272
 Rubus, 387
 rugosa, 232, 272
 rubra, 209
 sericea, 56
 Soulieana, 200
 sp., 56
 species, Tibetan, 56
 spinosissima, 132, 209
 altaica, 132
 vars. at Wisley, xlvi
 Sweginzowii, 57, 58, 232, 272
 inermis, 56, 58
 villosa (pomifera), 232, 272
 Wardii, 57, 58, v
- Roscoea purpurea pallida, 231, 271
- Rose Bessie Brown, 369
 borders at Wisley, 247
 Lady Curzon, 209
 Mermaid, 270
 Mildred Grant, 369
 species, some Tibetan, 56
- Rothschild, L. de, on the Home Wood at Exbury, 111
- Rowntree, L., "Flowering Shrubs of California and their value to the Gardener," 158
- Rubus biflorus, 170
 rusticanus inermis, 328
 \times thyrsiger, 328
- Rudbeckia laciniata, 272
- Ruscus aculeatus, 27
- Sabal Blackburnianum, 79
- Sagittaria japonica flore-pleno, 250
 sagittifolia japonica, 250
- Salaman, R. N., on Why "Jerusalem" Artichoke ?, 338, 376
- Salix acutifolia, 48
 alba, 170, 351
 britzensis, 170
 daphnooides, 48
 gall on, xli
 gracilistyla, 48
 vitellina, 170, 351
- Salvia farinacea Blue Bedder, 50
 Grahamii, 299
 superba, 200
 uliginosa, 316
- Santolina Chamaecyparissus, 94
- Sarcococca Hookeriana, 93
 humilis, 94
- Satureja montana, 231
- Saxifraga apiculata, 67
 Arco-Valleyi, 107
 Boydii, 107
 Burseriana, 47
 Gloria, xlvi
 \times Stribrnyi, 307, 309
- Cotyledon, 162
- Cranbourne exhb., xlvi
- Fortunei, 357
- Grisebachii, 66, 107, 130
- Kellereri, 309
- longifolia, 199

- Saxifraga longifolia** Tumbling Waters, 162, 252
marginata karadzicensis, A.M. 193, 1
 Mrs Leng, 67
 Mother Queen, xlivi
oppositifolia, 67, 307-8
 Stribrnyi, 107
umbrosa, 307-8
Scabiosa caucasica, 230
Schizocodon macrophyllus, 27
soldanelloides, 27
Schizostylis coccinea, 315, 358
 Mrs. Hegarty, 358
 "Science lends a hand in the Garden," by Sir F. Keeble, reviewed, 41
 "Scientific Principles of Plant Protection," by H. Martin, reviewed, 266
Scilla Tubergeniana, 47
Seale-Hayne Agricultural College, 301
 Secretary's page, 5, 43, 63, 103, 127, 159, 195, 227, 267, 311, 355, 399
Sedum Palmeri, 108
praealtum, 108
Sieboldii, 307-8
Seed and Food in War-time, 321
Seed saving, 198, 228, 269, 314
Sempervivum ciliosum forma Ali Botusch, xlvi
Climax exhib., lvi
Senecio formosus, 289
Sewell Medial competitions, lvi
Shewell-Cooper, W. E., and I. R., "Cook what you Grow," 157
Shortia galacifolia, 27
uniflora, 27
grandiflora, 107, xlv
Snowflake, A.M. 193, xlv
Show, Autumn, iv
Chelsea, iii
Daffodil, iii
 Midland, 106
 Early Market produce, iii
 first of the war, 25
 some plants in the, 119, 155, 182, 218, 252
Shows, iii
Shrubs, wall, and Climbers, 295
Silene acaulis, 81
Ingramii, 162
noctiflora, li
Sitona lineata, 410, lii
Sitwell, S., "Old-fashioned Flowers," 41
 "Skeptical Gardener, the," by H. John, reviewed, 194
Smith, K. M., on The Tomato and the Cigarette, 243
Snowdrop, double yellow, 164
twin-flowered, xlv
Soil, composts and sterilization; John Innes Leaflets, reviewed, 265
 "Soilless Culture Simplified," by A. Laurie, reviewed, 264
Solanum acaule, 290
crispum, A.G.M. 60, 297, v
 Glasnevin, 60
Darwinianum, 217
Gaertnerianum, 216, lv
- Solanum jasminoides**, 297
Koelreuterianum, 216, lv
luteum—*Lycopersicum*, 216
Lycopersicum, 215-16, lv
Lycopersicum—guineense, 216
Lycopersicum—luteum, 216
Lycopersicum—tuberosum, 216
nigrum, 215-16, lv
gracile—sisymbriifolium, 216
proteus, 216, lv
simplicifolium, 291
tuberosum, 216, 339
tubingense, 216, lv
Wendlandii, 199, 232, 272
Solidaster luteus, 232
Sophora tetaptera, 299
Sorbus alnifolia, 95
Aria, 95
lutescens, 95
majestica, 95
Aucuparia, 95
commixta, 95, 168
discolor, 95, 168
gracilis, 95
magnifica, 95
Matsumurana, 168
rufo-terruginea, 168
Sargentiana, 168
Vilmorinii, 95
Wilsoniana, 95
Spartium junceum, 200
Spenceria ramalana, 199
Sphaeralcea umbellata, 403
Spiraea Anthony Waterer, 94
arguta, 94, 108, 132
ariaefolia, 200
Aruncus, 200
canescens, 132
japonica atrosanguinea, 170
Bumalda, 94, 200
glabrata, 170
Thunbergii, 94
Spray calendar, 361
Stapelia hirsuta, 116
variegata, 117, xxxi
Statice Armeria, 307, 309
Stenomesson aurantiacum, 293
Stern, F. C., on Rosa Ernestii, 387
Sternbergia lutea, 315
Stevenson, J. B., iv
Stoker, F., on Ground Cover, 23
 on *Orphanidesia gaultherioides*, 210
 on S. Gilbert and his Florist's Vade-Mecum, 384
Stoney, J., "Fruit and Vegetable preserving and War-time Gardening," 310
Strawberries, 183
yellow edge of, 256
Strawberry American Seedling, 186, 258, 260
Aromatic, 185, 258
Brenda Gautrey, 184
Campbell's Seedling, 185, 258
Chiffoner, 184
Clark, yellow edge susceptibility, 185
Corvallis, 185, 258
crinkle, 256, 257

LXXVI PROCEEDINGS OF THE ROYAL HORTICULTURAL SOCIETY.

- | | |
|---|--|
| <p>Strawberry Culver, yellow edge susceptibility, 185
 Duchess of Kent, 258
 Elton Pine, 329
 " Etter So," 184
 Ettersberg, 121, 258
 Evesham Wonder, 184
 Hautbois, 329
 Huxley Giant, 184, 185, 186, 257-8, 260
 Little Scarlet, 329
 Marshall, yellow edge susceptibility, 185
 Oberschlesein, 258
 Pillnitz, 258
 Redburn, 186, 258
 Red Heart, yellow edge susceptibility, 185
 Royal Sovereign, 184, 186, 257-8, 329, 330, lii
 seedlings, 186
 Sir Joseph Paxton, 184, 257-8
 Tardive de Léopold, 184, 257-8, 260
 self-sterile, 185
 Virginian, 329
 Waterloo, 185
 Western Queen, 186
 yellow edge susceptibility, 260
 yellow edge, 256
 <i>Strelitzia Reginae</i>, 130, 162
 <i>Streptocarpus caulescens</i>, 18, 24
 Comptonii, 19
 cyaneus, 21, 22
 Dunnii, 17, 18, 20-1, 24, 285-6
 Galpinii, 20
 Gardenii, 20, 21
 gracilis, 19-20, 22, 24
 grandis, 18-20, 22, 288
 Haygarthii, 19
 Holstii, 18
 x kewensis, 21
 x Merton Giant, 22, 288
 parviflora, 21
 x Dunnii, 21
 Pole-Evansii, 20
 polyanthus, 19-21
 pusillus, 20, 22
 Rexii, 19-21, 24, 285-6
 x Dunnii, 21
 Saundersii, 21
 the genus, 17
 x Watsonii, 21
 Wendlandii, 20, 21
 Wilmsii, 20
 Woodii, 21
 <i>Strobilanthes atropurpureus</i>, 50, 232, 272
 Succulent Plants, an early book on, 115
 Sunflower, medal portraying, 378
 <i>Sycopsis sinensis</i>, 67
 <i>Symporicarpus laevigatus</i>, 170
 Synge, P. M., "Plants with Personality," 101
 <i>Syringa Vestale</i>, 132

 <i>Tacca cristata</i>, fruits, xli
 <i>Tamarix pentandra</i>, 95, 307, 309
 <i>Taxodium distichum</i>, 170 </p> | <p>Taylor, Dr. H. V., on Food from the Garden, 156
 <i>Tecoma australis</i>, 47
 <i>Tecophilaea cyanocrocus</i>, 155
 <i>Thalictrum foeniculaceum</i>, 252
 kiusianum, 199
 psilotifolium 252, P.C. lviii
 <i>Theropogon pallidus</i>, 199
 "Third and Fourth Generations, The," by M. C. Allwood, reviewed, 62
 Thomas, M., "Plant Physiology," 421
 <i>Thuja gigantea</i>, 93
 <i>Thymus azoricus</i>, 26
 <i>Herbabarona</i>, 26
 <i>Serpullum</i>, 25
 coccineus, 26
 lanuginosus, 26
 <i>Tibouchina semidecadandra</i>, 315, 357, 403
 <i>Tipula</i> species, 410
 Tomato and the Cigarette, 243
 Carter's Sunrise, 332
 Kondine Red, 332
 mosaic disease, 243-4
 plant, adventitious shoots, 288
 spotted wilt, 243
 stripe disease, 243
 yellow mosaic, 246
 Trials, Flower and Vegetable, iv
 <i>Trichodiadema barbatum</i>, 117
 <i>Tricuspidaria dependens</i>, 298
 lanceolata, 298
 <i>Trifolium uniflorum</i>, 154
 <i>Triptilion spinosum</i>, 154
 <i>Tritonia crocata</i> var. exhib., xviii
 <i>Tropaeolum speciosum</i>, 231
 tuberosum, 292
 Tulip, aerial bulb, li
 breaking, xliv
 Clos de Vougeot, xlvi
 breaking, xlvi
 Keizerskroon, 155
 <i>Tulipa australis</i>, 288
 Greigii, xliv, xlvi
 Hageri, 107, 131
 <i>Kaufmanniana</i>, 66
 <i>Orphanidea</i>, 107, 131
 praecox, xliv, xlii
 praestans, 66
 scardica exhib., lv
 silvestris, 288

 Vaccinium <i>Arctostaphylos</i>, 210
 canadense, 316
 corymbosum, 316, 358
 erythrocarpum, 25
 modestum, 137
 pennsylvanicum, 170, 316
 virgatum, 169, 316, 358
 <i>Vitis-Idaea</i>, 27
 yunnanensis, 319, 320
 <i>Vancouveria planipetala</i>, 27
 <i>Vanda coerulea</i>, 253
 coeruleascens, 253
 "Vegetable Crops under Glass," by W. F. Bewley, reviewed, 157
 Vegetable garden in January, 7
 pests and their control, 407
 aphis, 412, lviii </p> |
|---|--|

- Vegetable pests, beetles, 414
 caterpillars, 414
 climatic factors and their effect on, 409
 distribution of, 409
 eelworms, 411, *lxix*
 flies, 415
 food of, 409
 slugs, 412
 weevils, 415, *lxix*
- Vegetables, continuous supply, lecture, *iii*
 preserving, 350
 winter, different ways of cooking, 28
- Verbascum paniculatum, 200
- Verbena bonariensis, 316
 chamaedryfolia, 271, 291, 315
- Veronica Hulkeana, 297
 incana Wendy, 51
 lanuginosa, 139, 140
- Viburnum fragrans, 48, 93, 277, 358, 404
 Opulus sterile, 94
 prunifolium, 170
 Tinus, 93, 307-8
 tomentosum plicatum, 94
- Victoria Medal of Honour, vii, *xxxii*
- Victoria regia, 353
- Vinca difformis, 403
 minor, 27
- Viola gracilis, 27
 labradorica, 25, 27
- Vitis Coignetae, 170
 flexuosa, 170
 purpurea, 170
- Vuylstekeara × Armanda, A.M. 152,
xhii
 × Cambria, exhb., *xxxvi*
 × Redskin, Artona, A.M. *xl*
- Water Garden, 243
 Lilies at Wisley, *liv*
- Weiss, Prof. F. E., on Graft hybrids and Chimaeras, 212, 237
- White Fly parasite, v
 "Wild Foods of Britain," by Jason Hill, reviewed, 310
- Wilson, G. Fox, on the Cabbage White Butterfly, 278
 on Some Seasonable Pests of garden vegetables and their control, 407
- Wisley, donations of plants, etc., iv, *xxxvii*
- Fruit trials, lessons from, 85, 183, 256
- Gardens, 46, 66, 106, 130, 162, 198, 230, 270, 314, 357, 403, iv
 Rose borders, 247
 Water Lilies, *liv*
- Laboratory, v
 trials, 105
- Wistaria multijuga, 203
 sinensis, 391
- Wood, Lt-Col. J. L., on Primula sonchifolia, 181
- Woolly aphis, 331
 "World of Plant Life, The," by C. J. Hylander, reviewed, 42
- Wolthuys, J. J. Verbeck, "The Enigma of the Origin of Monstrosity and Crystallization in Succulent Plants," 156
- Xanthorrhiza apifolia, 170
- Yeo, A. W., Editor "How to Grow Garden Food," 126
- Yucca concava, *xxxix*
- Zauschneria californica, 271, 315
 mexicana, 231
- Zygopetalum crinitum, 253
 Mackayi, 253

ERRATA AND CORRIGENDA.

- P. 48, line 23, for *I. daphnoides*, read *S. daphnoides*.
 P. 73, line 20, for *semiplava*, read *semiplena*.
 P. 253, line 27, for *Malus ionensis flore pleno*, read *Malus ionensis plena*.
 P. 332, fig. 90, for Tomato Kondine Red, read Tomato Hybrid with Carter's Sunrise, and fig. 92, for Tomato Hybrid with Carter's Sunrise, read Tomato Kondine Red.
 P. 391, line 3, for Josiah Wedgwood, read John Wedgwood.
 P. *xxxii*, fig. 37, for *Eucryphia glutinosa*, read *Eucryphia lucida* (*E. Billardieri*).

EXTRACTS FROM THE PROCEEDINGS
OF THE
ROYAL HORTICULTURAL SOCIETY.

REPORT OF THE COUNCIL

FOR THE ONE HUNDRED AND THIRTY-SIXTH ANNUAL MEETING OF THE SOCIETY, TO BE HELD IN THE LECTURE ROOM OF ITS NEW HALL, GREYCOAT STREET, WESTMINSTER, AT 3 P.M. ON TUESDAY, FEBRUARY 20, 1940.

The Society's Progress.—The disturbed political situation during the earlier part of the year, culminating in the outbreak of hostilities, has necessarily had its effect on the activities of the Society. The following tabulated figures of the Fellowship show that the Society has, however, held its own during the year :

LOSS BY DEATH IN 1939.		ELECTIONS IN 1939.	
Honorary Fellows ..	2	Life Fellows ..	7
Associates of Honour ..	5	4 Guinea Fellows ..	15
Life Fellows ..	7	2 " "	932
4 Guinea Fellows ..	6	1 " "	1,896
2 " ..	282	Associates ..	82
1 " ..	247	Affiliated Societies ..	53
Associates ..	5		
	<hr/>		<hr/>
	554		2,985
	<hr/>		<hr/>

LOSS BY RESIGNATION.		NET DECREASE	
4 Guinea Fellows ..	12	Resignations and Deaths ..	3,010
2 " ..	829	Elections ..	2,985
1 " ..	1,497		<hr/>
Associates ..	91		25
Affiliated Societies ..	27		
	<hr/>		
	2,456		

Total on November 8, 1938 ..	36,577
Total on November 7, 1939 ..	36,552

Programme for 1940.—It has been decided to maintain the activities of the Society to the fullest extent which circumstances permit. A full programme of Fortnightly Meetings and Shows, with lectures, has

been arranged, commencing from the Annual Meeting on February 20. The monthly JOURNAL and most of the other publications of the Society will be continued. The Wisley Gardens will, of course, remain open as heretofore. The demonstrations and trials at Wisley, and the Society's examinations will take place as usual, while the horticultural advice and garden inspection services will remain available for Fellows. It is sincerely hoped that the Fellows and Associates of the Society, realizing as they must the importance of the Society's work in national life, will continue their part in upholding the strength and numbers of the Society, without which its utility and the privileges it offers must necessarily be restricted.

Food Production.—The Society has been working in close co-operation with the Ministry of Agriculture on the question of Food Production and two publications have been produced: a bulletin entitled "Food from the Garden," and a leaflet entitled "Vegetable Production in Private Gardens and Allotments." This latter leaflet was distributed with the November number of the JOURNAL.

In connection with the Horticultural Committees which have been set up by the Ministry in the larger centres throughout the country, the Society has formed a panel of gardeners and experts for the purpose of giving lectures and demonstrations when called upon to do so.

Nurserymen.—While it was recognized that the increase of food production must of necessity be the prior object of horticulture at the present time, nevertheless the Council decided to issue an appeal to all amateur gardeners not to ignore the ornamental side of horticulture nor to withhold orders from nurserymen. It must always be remembered that the maintenance of nurserymen's businesses and stock will play an essential part in the horticultural life of the country after the cessation of hostilities.

Obituary.—The gardening world and the Society have lost during the year a number of notable horticulturists. In the first place mention must be made of the death of Mr. E. A. Bunyard, who, after many years of service on the Council and as Chairman of the Fruit and Vegetable Committee, had retired to take up the duties of Editor of the Society's JOURNAL and Publications and Keeper of the Library. His invaluable knowledge and advice, especially on fruit culture in all its forms, will be greatly missed.

The death of Mr. J. C. Williams of Caerhays Castle, Cornwall, a Vice-President of the Society, has removed one of the most distinguished horticulturists in the country. To him is largely due the introduction from China in recent years of countless new Rhododendrons and other plants.

Of those on whom the honour of V.M.H. had been conferred there have died Sir William G. Lobjoit, well known for his public services on behalf of horticulture; the Rev. Canon Arthur T. Boscowen, a distinguished Cornish amateur gardener; Mr. W. A. Bilney, a past

Member of Council, and Mr. D. Bliss, the retired Superintendent of the Swansea Public Parks and Gardens ; and, of the Associates of Honour, Mr. J. Benbow, late head gardener at La Mortola, Ventimiglia, Italy, and Mr. C. Webster, head gardener at Gordon Castle, Fochabers.

There have also passed away two Honorary Fellows, Professor G. Carpenter and Dr. H. Correvon, also Mr. E. H. Wilding, a Vice-Chairman of the Joint Rhododendron Committee and a noted amateur grower of Rhododendrons and other shrubs. The passing of Mr. P. Rosenheim, a member of several Committees, also occurred during the year.

Fortnightly Meetings and Shows.—The Fortnightly Meetings and Shows in the Halls were well attended up to the outbreak of hostilities, which inevitably interrupted the sequence of Meetings. It was, however, found possible to organize a closing Autumn Show for the year on Tuesday and Wednesday, October 24 and 25, at which the customary fruit and vegetable competitions for amateurs were also held. The lighting restrictions among other reasons have prevented the holding of the usual Shows in November and December.

The Daffodil Show.—The Daffodil Show was held on Thursday and Friday, April 13 and 14, and in spite of the somewhat unfavourable weather conditions immediately prior to the Show, there was a record number of entries and there has seldom been staged such a brilliant display of these flowers. A full account of the Show will be found in the Daffodil Year-book for 1939.

A Joint Committee with the Midland Daffodil Society has been formed.

The Show in 1940 will be held in conjunction with a Fortnightly Show on Tuesday and Wednesday, April 16 and 17, and the schedule has been circulated.

Early Market Produce Show.—This Show was held for the eighth time in the Old Hall of the Society on Thursday and Friday, April 13 and 14, and at the luncheon in connection with the Show a message from Major Sir Reginald Dorman-Smith, the Minister of Agriculture, was read congratulating the Society on the great work that it had done for the encouragement of early market produce. In the afternoon Mr. Ambrose Heath lectured on "Salads and their Making."

It has been decided not to hold the Show in 1940.

Chelsea Show.—The Chelsea Show was held on Wednesday, Thursday and Friday, May 17, 18 and 19, and, in spite of the very unseasonable weather, the attendance was as large as ever.

Owing to the absence of Their Majesties The King and Queen on their tour in Canada the Society was this year not honoured by their presence, but it is with great gratification that it is recorded that Her Majesty Queen Mary and other members of the Royal Family graciously showed their continued interest in the work of the Society by visiting the Show.

It is greatly regretted that it will not be possible to hold the Chelsea Show in 1940.

Autumn Show.—Arrangements had been made to hold a Great Autumn Show at Earls Court in September, but the outbreak of hostilities made it necessary to cancel these.

The Lily Group.—There were three meetings of the Lily Group and visits to the garden of Mr. W. Hutchinson at Ridgeland House, Finchampstead, Berks, and to the nursery of Messrs. W. A. Constable, Ltd., at Burnham, Bucks, took place.

A programme is being arranged for 1940.

Rhododendron Conference.—The Rhododendron Conference which had been planned for 1940 has been postponed.

Wisley : The Gardens.—Further Rhododendrons and other shrubs and trees have been planted on the new ground adjoining the south side of the Gardens. It has been decided to use a large portion of the open ground for the production of food crops.

The plants in the Rhododendron Trials are now well established and will be worth a visit during the flowering season.

Every effort will be made to maintain the Gardens during the war as long as labour is available.

Donations of Plants and Seeds.—Many generous donations of both plants and seeds have been received from Fellows and from public gardens. These gifts have added considerably to the interest of the collections of plants at Wisley. In some cases the quantities of seed sent have been so generous as to allow of their being added to the annual list of seeds sent to Fellows in January.

Demonstrations.—The Demonstrations of practical garden operations continue to prove popular with Fellows and their friends. The particulars of the demonstrations for 1940 will be given on the Society's tickets and also from time to time in the JOURNAL.

Flower and Vegetable Trials.—During 1939 the standard collections of Border Carnations, Dahlias, Delphiniums, Early-flowering Chrysanthemums, Narcissi, Irises and Sweet Peas were among the attractive features in the Gardens. Other trials held at Wisley included China Asters (late flowering varieties), dwarf Godetias, Dimorphothecas, Heliotropes, Montbretias and Viola cornuta types and hybrids, which latter will be finally judged in 1940. The vegetable trials carried out were of Brussels Sprouts, Outdoor Cucumbers, Late Peas and Runner Beans. The trial of Autumn-sown Onions and of Autumn-sown Cauliflowers will be repeated during the coming season.

In the year 1940 the following vegetables will be grown for trial and demonstration: Kales, Cabbage Lettuces (summer varieties), Onions (autumn and spring sown), Cauliflowers and Carrots (all varieties); and the following flowers: Iceland Poppies, Shirley Poppies, Stocks ('Winter Brompton' and 'East Lothian') and Sweet Williams.

The standard collections of flowering plants to which each year the best of the latest varieties are added, will be maintained as usual.

VICTORIA MEDAL OF HONOUR, 1939.



ALEX. DICKSON



THE MARQUESS OF HEADFORT



C. P. RAFFILL.

(See p. viii.)



J. B. STEVENSON.

[*To face p. iv.*



FIG. II.—*PHYGELIUS AEQUALIS.*
(See p. 51.)

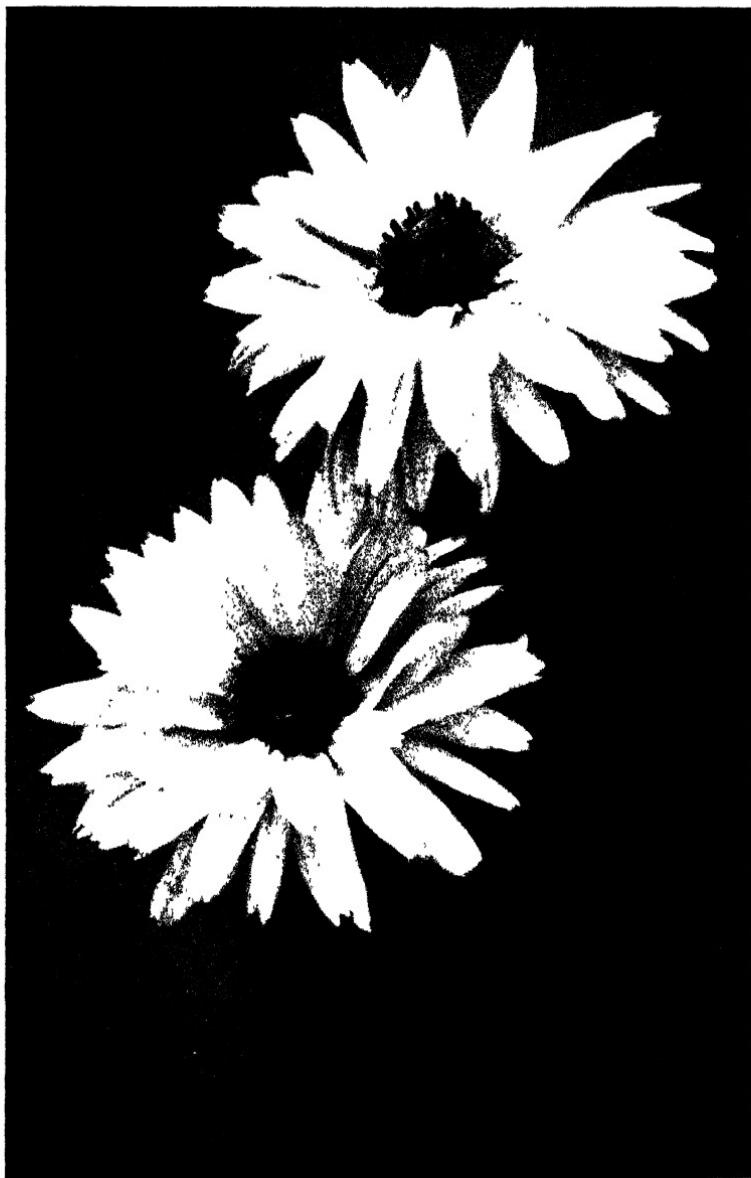


FIG. 12.—*HELIOPSIS GIGANTEA*.
(See p. 50)

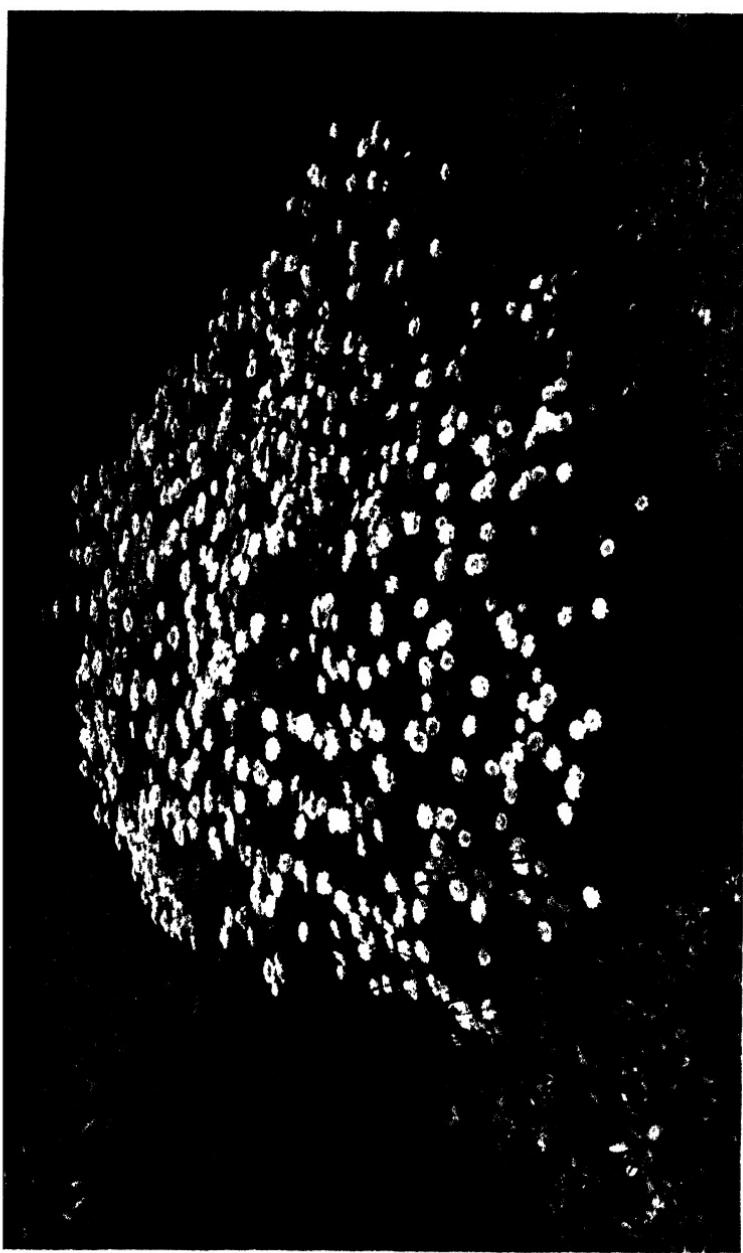


FIG. 13. *Aspergillus sancti-johannis* M. WISLIZY
See p. 51.



FIG. 14 PRIMULÆ FLORENTIAE
(See p. 60.)



FIG. 15.—*SOLANUM CRISPUM*.
(See p. 60.)

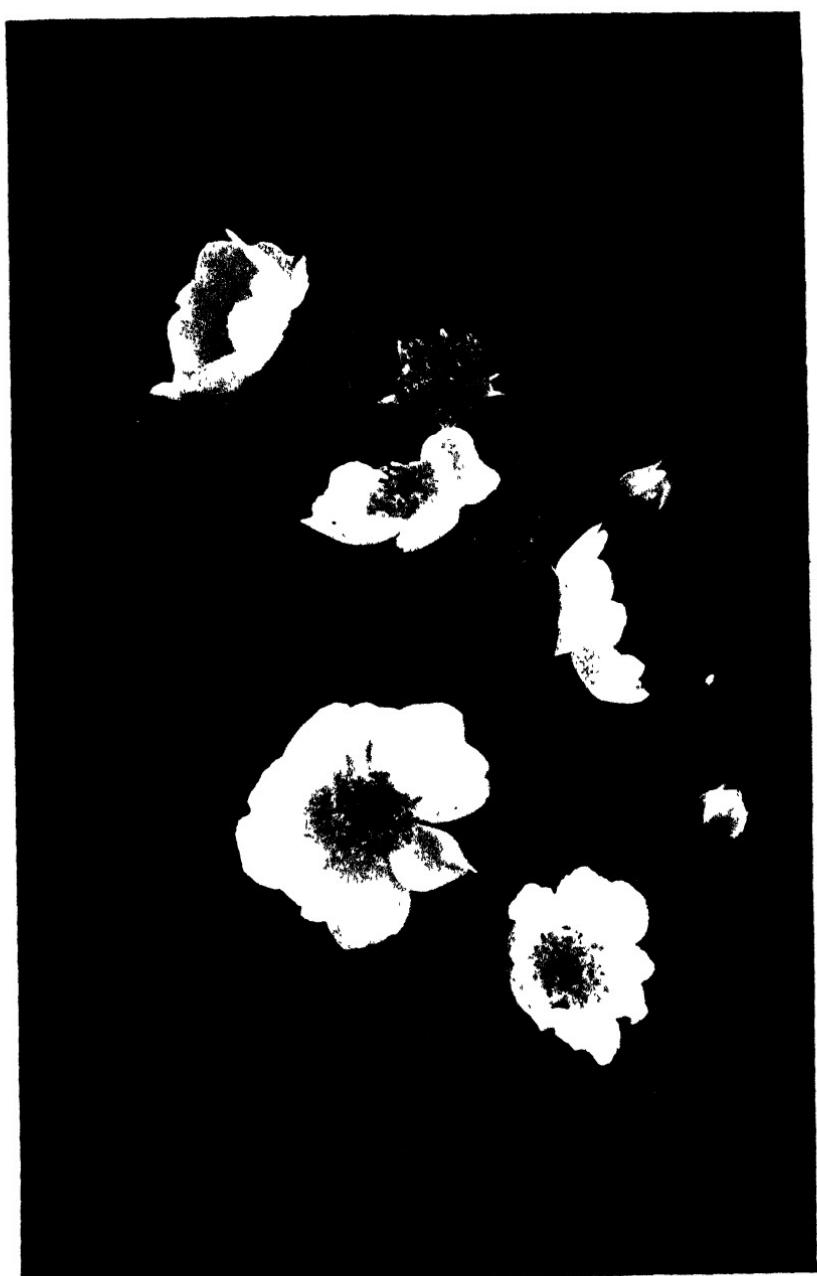


FIG. 16.—*ROSA WARDII*.
(See p. 57)



FIG. 17.—*DRACOCEPHALUM SILVATICUM* AT KEW
(See p. 52.)

[*See face p. v.*]

Commercial Fruit Trials.—The 1939 season has been one of the most successful since the commencement of the trials. The Apple crop in particular has been heavy and many new varieties have fruited for the first time. A large number of Fellows and others interested in the work have visited the grounds. New varieties have been planted for trial and numerous others have been added to the standard collections.

The recording of the vegetative characters of all kinds of fruit has been continued as have also the pollination experiments.

The Wisley Laboratories : School of Horticulture.—The courses of instruction given in the School of Horticulture have been continued. A number of external students have attended these courses.

Investigations.—The investigations conducted with various species of Lilies have again been continued and a short popular account appears in the Lily Year-book of the observations made concerning the duration of Lily roots.

The investigations of growth substances used to facilitate propagation of shrubs and herbaceous plants are still being carried on and the reports on the results will continue to appear in the Society's JOURNAL.

The Entomologist has completed an investigation into the susceptibility of many bulbous plants to the Narcissus strain of the Stem Eel-worm, and a report will be published in the JOURNAL. The mite and insect pests of Amaryllis bulbs have been studied and a report on them has been published in the JOURNAL.

Plots of Rose bushes for testing the efficiency of certain winter spray treatments in controlling Black Spot Disease are now established. The bushes showed heavy infection this summer so that data on the effect of spraying this winter should be available next autumn.

Tests of Antirrhinum varieties for resistance to Rust disease were again carried out in 1939. One more variety showed complete resistance, making four in all. Further selection and crossing experiments have been done with a view to improvement in flower character and colour, and the harvest of this seed has been satisfactory.

Advisory Services.—The advisory services again formed a prominent feature of the work of the laboratory staff and more than two thousand three hundred inquiries have been dealt with during the year.

In regard to food production it is hoped that Fellows will continue to make full use of the available services, which include soil examinations and information regarding fertilisers and the identification and control of insect pests, fungus diseases and weeds.

White Fly Parasite.—The distribution of the White Fly Parasite has been continued and the demand for it is well maintained.

Expeditions.—Seeds have been received from Professor H. H. Hu's second Chinese collecting expedition and subscriptions have been

collected for a third expedition, which is now taking place. Seeds have also been received from Mr. Peter Davis's expedition in the Persian highlands, from Captain F. Kingdon Ward's expedition in the China-Burma borderlands, and from Mr. C. R. Worth's expedition in the Southern Rocky Mountains.

Lectures at the Hall.—The Council desires to express its grateful thanks to those who have lectured at the Fortnightly Meetings and especially to Dr. J. C. Willis, who delivered the Masters Memorial Lectures, taking as his subject : "How Plants have found their Homes."

In the coming year the Masters Memorial Lectures will be given on Tuesday, April 2, and Tuesday, April 16, when Professor F. E. Weiss will speak on "Graft-hybrids and Chimaeras."

The Talks on the flowers in the Show held on the second days proved popular and will be continued in 1940.

The Society's Publications.—The following publications have appeared during the year : the "Lily Year-Book for 1939," the "Daffodil Year-Book for 1939," and a pamphlet on "The Newer Gentians," by Mr. C. T. Musgrave. Various R.H.S. pamphlets have been re-edited and reissued.

It is hoped to carry out the arrangements made with the Oxford University Press for the production and publication of a work to be entitled the Royal Horticultural Society's Dictionary of Gardening, based on the famous Nicholson's Illustrated Dictionary of Gardening. Mr. F. J. Chittenden, the Editor, has already started on his task.

Curtis's Botanical Magazine will continue to appear and good progress has been made with the Supplement to the Index Londinensis.

It is hoped that the second volume of the Horticultural Colour Chart will have been published by the time that this Report appears.

Deputations.—Delegates of the Society visited the Royal Horticultural Society of Ireland's Flower Show at Dublin on August 8 and the Southport Flower Show on August 23. The Council desires to express its thanks for the kind reception and the hospitality given to these deputations.

Seventh International Congress of Genetics at Edinburgh.—The President received on behalf of the Society the members of the Seventh International Congress of Genetics at a reception in the New Hall on the occasion of the Fortnightly Show on Tuesday, August 15, prior to the holding of the Congress at Edinburgh on Wednesday, August 23.

The Lindley Library.—From January 1 to November 8, 1939, 320 books and pamphlets have been added to the Library, the more noteworthy being : A. Camus, "Les chênes, monographie du genre *Quercus*" (2 vols. text, 2 vols. plates; Paris, 1934-39); H. C. von Carlowitz, "Silvicultura oeconomica" (Leipzig, 1732); A. von Degen,

"*Flora Velebitica*" (3 vols.; Budapest, 1936-38); M. Diesel, "*Erlustierende Augenweide in Vorstellung herrlicher Garten*" (Augsburg, 17—); A. F. Frézier, "*Voyage to the South-sea*" (London, 1717); A. Jordan, "*Pugillus plantarum novarum*" (Paris, 1852); T. Lagerberg and J. Holmboe, "*Våre ville planter*" (vols. 1-4; Oslo, 1937-39); A.E. May and W. May, "*Choice flowers*" (London, 1849); "*Nova Guinea, Botanique*" (3 vols., Leiden, 1909-32); C. J. Pitard, "*Exploration scientifique du Maroc, Botanique*" (Paris, 1913); J. L. M. Poiret, "*Histoire . . . des plantes de l'Europe*" (8 vols.; Paris, 1825-29); J. Renton, "*Treatise on gardening*" (London, c. 1780), the subject of an article in *JOURNAL R.H.S.*, 63, 422-28 (1938), by the donor, Mr. W. Roberts; C. A. Schenck, "*Fremdländische Wald- und Park-bäume*" (3 vols.; Berlin, 1939); S. Shigemori, "*Nippon teien shi zukan*" (now complete in 26 vols.; Tokyo, 1936-39); "*Vick's Monthly magazine*" (vols. 2-6; Rochester, N.Y., 1879-83); M. V. Walcott, "*Illustrations of North American pitcher plants*" (Washington, D.C., 1935); a collection of illustrations of tropical fruits brought together by H. M. Phipson (d. 1936).

Additional copies of much sought after books, especially on food production, vegetable and fruit growing and preservation, have been purchased for loan purposes.

The Society's Examinations.—The National Diploma in Horticulture has been awarded to 13 candidates. Forty-four candidates passed the Preliminary Examination.

In the General Examination Certificates were awarded to 384 Senior and 137 Junior candidates.

In the Teachers' Preliminary Examinations in School and Cottage Gardening 293 candidates were successful, of whom 31 were awarded the Advanced Certificate.

In the Spring Examination of the British Floral Art Diploma 5 candidates were awarded Diplomas; the Autumn Examination was not completed.

The Examination for the National Certificate in Elementary Horticultural Practice for students at Farm Institutes was well supported this year; 95 candidates received the Certificate.

The Victoria Medal of Honour.—The Victoria Medal of Honour has been awarded to the Marquess of Headfort, President of the Royal Horticultural and Arboricultural Society of Ireland; to Mr. Alex. Dickson, for his work with regard to Roses; to Mr. C. P. Raffill, Assistant Curator of the Royal Botanic Gardens, Kew, and to Mr. J. B. Stevenson, for his work on Rhododendrons. Portraits will be found facing p. iv.

The Associates of Honour.—The Associateship of Honour has been awarded to Mr. Wm. Clark, Superintendent of Parks and Cemeteries, Southport; to Mr. F. Hanger, Head Gardener at Exbury House, Exbury, Southampton; and to Mr. J. Jeffrey, Head Gardener at Lowther Castle, Penrith.

The Lawrence Medal.—The Lawrence Medal for the best exhibit staged at the Society's Shows during the year has been awarded to Lord Swaythling for his exhibit of Lilies staged on July 4, 1939.

The Holford Medal.—The Holford Medal for the best exhibit of plants and/or flowers (fruit and vegetables excluded) shown by an amateur during the year in the Halls of the Society has been awarded to Lord Swaythling for his exhibit of Lilies staged on July 4, 1939.

The Veitch Memorial Medals.—Awards have been made as follows : A Gold Medal to Sir Daniel Hall, K.C.B., for his services to horticulture, and on his retirement from the Directorship of the John Innes Horticultural Institution ; and a Silver Medal to Dr. Kate Barratt, C.B.E., for her services to horticulture and on the occasion of the 50th anniversary of the Horticultural College, Swanley.

The Sander Medal.—The Sander Medal has been awarded to Sir Jeremiah Colman, Bart., V.M.H., for *Lycaste 'Sir Jeremiah Colman'*, shown on January 24, 1939, which was considered to be the best new greenhouse plant of general utility shown to the Society in the course of the year.

The George Moore Medal.—The George Moore Medal has been awarded to Mr. H. P. Lawson for *Cypripedium 'Miracle'* var. 'Alpha,' shown on June 20, 1939, which was considered to be the best new *Cypripedium* shown to the Society in the course of the year.

The Williams Memorial Medals.—The Williams Memorial Medals for the best group of plants and/or cut blooms of one genus (fruit and vegetables excepted) which show excellence in cultivation, exhibited during the year, have been awarded to Baron Bruno Schröder, for his exhibit of *Cymbidiums* staged on March 21, 1939, and to Messrs. R. Bolton & Son for their exhibit of Sweet Peas staged on June 6, 1939.

The Reginald Cory Memorial Cup.—The Reginald Cory Memorial Cup for the raiser of the best new hardy hybrid of garden origin shown to the Society in the course of the year has been awarded to Dr. C. C. Hurst for his *Rosa 'Cantab'* (*Rosa nutkana* × R. 'Red Letter Day'), shown on June 6, 1939.

The Loder Rhododendron Cup.—The Loder Rhododendron Cup has been awarded to Mr. George H. Johnstone, a noted amateur grower and hybridizer of Rhododendrons.

The Sherwood Cup.—The Sherwood Cup for the most meritorious exhibit at the Chelsea Show was awarded to Messrs. Barr & Sons for an exhibit of Tulips.

Gifts to the Society.—The Council wishes to record its gratitude to numerous Fellows and friends of the Society for gifts of plants, seeds and books ; to the Garden Club of America for the presentation of its medal for award to an amateur exhibitor ; to Mrs. H. W. Hall for

her gifts of prizes for Gladioli competitions ; to the Orchid Trade for the presentation of trophies for Orchid competitions for amateurs ; to the Rev. Professor E. S. Lyttel for the Lyttel Lily Cup to be awarded annually for good work on behalf of Lilies, Nomocharis or Fritillaries ; to the executors of the late Major George Churcher for a collection of Paeonies ; to Mrs. Cuthbertson for a portrait of the late William Cuthbertson and to Messrs. Sutton & Sons, Ltd., for their gift of lantern slides.

Council.—Changes have occurred during the year in the membership of the Council. Dr. H. V. Taylor was appointed to replace the late Mr. E. A. Bunyard for the remaining term of his office, and Sir Daniel Hall, K.C.B., also retired and this vacancy will be filled at the Annual Meeting.

The Council desires to express its grateful thanks to Sir Daniel Hall, and the two other retiring Members, Major F. C. Stern and Professor F. E. Weiss, for their invaluable services to the Society during their terms of office and is pleased to think that their services will still be available on the various committees of which they are members.

The Press.—The Council desires to express its gratitude to the Press for their continued support and goodwill and for their friendly interest in the affairs of the Society.

Committees, Judges and Examiners.—Again the work of the members of the various Committees, of the Judges and of the Examiners has been of the utmost value to the Society, and the Council desires to record its thanks for the assistance so rendered.

Staff.—Mr. F. J. Chittenden, who has completed thirty-three years in the service of the Society, has given up his position as Editor of the Society's JOURNAL and Publications and Keeper of the Lindley Library to take up the Editorship of the Royal Horticultural Society's Dictionary of Gardening. Mr. Chittenden's work for the Society in these and other positions has been invaluable and has earned the deep gratitude of the Council and Fellows.

Sir Daniel Hall, late Director of the John Innes Horticultural Institution, has honoured the Society by consenting to take up the positions held by Mr. Chittenden. He will have the assistance of Mr. R. E. Hay, lately on the staff of the Gardeners' Chronicle, as associate Editor.

The Council desires to express its appreciation of the work of the Secretary and the staff at Vincent Square and of the Director and the staff at the Society's Gardens at Wisley.

Signed on behalf of the Council,

ABERCONWAY,

President.

December 30, 1939.

Dr.

ANNUAL REVENUE & EXPENDITURE ACCOUNT

	£ s. d.	£ s. d.
To LONDON—		
ESTABLISHMENT EXPENSES LESS ALLOCATIONS—		
Rent, Rates and Taxes	3,626 8 3	
Salaries and Wages	8,546 0 6	
Other Establishment Expenses, including Light, Fuel, Stationery, Professional Fees, and Renewals	<u>5,293 6 4</u>	<u>17,465 15 1</u>
.. WISLEY—		
Net Expenditure for Year, as per separate Account		13,594 12 11
.. PRINTING AND POSTAGE OF JOURNAL AND OTHER PUBLICATIONS		10,442 1 11
Less Sales and Advertisements	<u>2,966 1 8</u>	<u>7,476 5 3</u>
.. STAFF PENSIONS		1,262 6 3
Less Contributions by Staff as per Scheme	<u>523 15 5</u>	<u>738 10 10</u>
.. MEETINGS—	<i>£ s. d.</i>	
Expenses, Labour and Over- heads of Special and other Meetings	2,489 19 9	
Less Receipts	<u>395 0 8</u>	<u>2,094 19 1</u>
Spring Meeting :		
Receipts	10,088 14 9	
Less Expenses, Labour and Overheads	<u>8,585 7 6</u>	<u>1,503 7 3</u>
Autumn Meeting (cancelled owing to the war)		591 11 10
		2,081 11 11
		<u>2,673 3 9</u>
.. CUPS AND MEDALS		405 10 1
.. GARDEN INSPECTIONS—		38 5 0
.. CONTRIBUTIONS TO LINDLEY LIBRARY, as per Trust Account—		
Purchase of Books	356 15 6	
Salaries, etc.	<u>556 2 4</u>	<u>912 17 10</u>
.. SPECIAL EXPENDITURE—		
Expeditions, Professor Hu	40 0 0	
" Captain Kingdon Ward	50 0 0	
" Dr. T H. Goodspeed	50 0 0	
" P. H. Davis	10 0 0	
" C. R. Worth	4 5 6	
Donations, Gardeners' Royal Benevolent Inst.	52 10 0	
" Royal Gardeners' Orphan Fund	21 0 0	
" British Growers' Publicity Council	26 5 0	
" Roads Beautifying Association	51 5 0	
" East Malling Research Station	105 0 0	
" British Colour Council	5 5 0	
" London Children's Gardens	10 10 0	
" London Gardens Society	15 15 0	
Genetic Conference Reception	29 19 2	
Pritzel Revision	961 9 10	
Air Raid Precautions	<u>358 0 0</u>	<u>1,791 4 6</u>
BOTANICAL MAGAZINE	610 0 6	
Add Work in Advance	<u>138 4 8</u>	<u>748 5 2</u>
Carried forward		£45,844 10 5

FOR THE YEAR ENDED 31st DECEMBER, 1939.

Cr.

	£	s.	d.	£	s.	d.
By ANNUAL SUBSCRIPTIONS				53,300	12	11
.. DIVIDENDS AND INTEREST	1,563	16	1			
.. Do. Do. DAVIS TRUST	43	17	10			
.. DEPOSIT INTEREST	213	3	3	1,820	17	2
.. HALL LETTINGS, Gross				3,319	3	6
.. LIFE COMPOSITIONS—						
Being amounts paid by Fellows who have died during the year				178	10	0
.. RENT OF FREEHOLD PROPERTY (Wesley)				286	14	5
Carried forward	£58,905	18	0			

Dr.

ANNUAL REVENUE & EXPENDITURE ACCOUNT

	Brought forward	£	s.	d.	£	s.	d.
To EXAMINATIONS IN HORTICULTURE—					45,844	10	5
Expenses		842	13	6			
Less Fees		825	18	7			
					16	14	11
.. GENERAL SCHOLARSHIPS		134	5	4			
Less Contribution from Knott Scholarship Fund	£	s.	d.				
	30	0	0				
Less Contribution from Worshipful Company of Gardeners	60	0	0				
		90	0	0			
					44	5	4
.. OLD AND NEW HALLS SINKING FUND APPROPRIATION					3,366	0	0
.. RESTAURANTS—							
Deficit after charging Proportion of Overhead Expenses		987	18	9			
.. BALANCE, being Excess of Revenue over Expenditure, carried to General Reserve		8,646	8	7			
		£58,905	18	0			

ROYAL HORTICULTURAL SOCIETY

ESTABLISHED 1804.

INCORPORATED 1809.

NOTICE IS HEREBY GIVEN that the ONE HUNDRED AND THIRTY-SIXTH ANNUAL MEETING of the Fellows of the Society will be held in the LECTURE ROOM, NEW HALL, GREYCOAT STREET, WESTMINSTER, on Tuesday, February 20, 1940, at 3 P.M. precisely, for the purpose of receiving the Report of the Council for the past year, and electing a President, Vice-Presidents, Treasurer, Four Members of Council, and Auditor for the ensuing year.

By Order of the Council,

F. R. DURHAM,

Secretary.

ROYAL HORTICULTURAL HALL,

VINCENT SQUARE, WESTMINSTER, S.W. 1.

January 31, 1940.

ANNUAL MEETING

To be held at 3 P.M., February 20, 1940

AGENDA

- Minutes of the last Annual Meeting, held February 21, 1939.
- Report of the Council.
- President's Address.
- Treasurer's Statement.
- Election of President.
- Election of Vice-Presidents.
- Election of four Members of Council.
- Election of Treasurer.
- Election of Auditor.
- Presentation of the Victoria Medals of Honour.
- Presentation of Associate of Honour Badges.
- Presentation of the Lawrence Medal.
- Presentation of the Holford Medal.
- Presentation of the Veitch Memorial Medals.
- Presentation of the Sander Medal.
- Presentation of the George Moore Medal.
- Presentation of the Williams Memorial Medals.
- Presentation of the Reginald Cory Memorial Cup.
- Presentation of the Loder Rhododendron Cup.

LIST OF NOMINATIONS

The following list of nominations of President, Vice-Presidents, Members of the Council and Officers for election is circulated in accordance with By-law 58 :

	<i>Proposed by</i>	<i>Seconded by</i>
<i>As President :</i>		
LORD ABERCONWAY, C.B.E., V.M.H.	Mr. C. T. Musgrave.	Mr. G. Monro.
<i>As Vice-Presidents :</i>		
THE DUKE OF BEDFORD, K.G., K.B.E., F.R.S.		
THE DUKE OF PORTLAND, K.G., G.C.V.O., P.C.		
THE MARQUESS OF HEADFORT, D.L., V.M.H.		
THE VISCOUNT ULLSWATER, G.C.B.		
SIR DANIEL HALL, K.C.B., LL.D., D.Sc., F.R.S., V.M.H.	Lord Aberconway.	Mr. G. Monro.
Lieut.-Colonel SIR DAVID PRAIN, C.M.G., C.I.E., LL.D., F.R.S., F.L.S., V.M.H.		
Mr. E. A. BOWLES, M.A., F.L.S., F.R.E.S., V.M.H.		
Mr. C. T. MUSGRAVE, V.M.H.		
Mr. C. G. A. NIX, V.M.H.		

As Members of Council :

PROF. V. H. BLACKMAN, M.A., Sc.D., F.R.S.	Mr. E. A. Bowles	Major F. C. Stern.
Mr. A. CHEAL	Lt.-Col. L.C.R. Messel.	Mr. C. T. Musgrave.
Mr. J. B. STEVENSON, V.M.H.	Mr. G. W. Leak.	The Hon. Lewis Palmer.
DR. H. V. TAYLOR, O.B.E., V.M.H.	Sir Daniel Hall.	Mr. F. A. Secrett.

As Treasurer :

Mr. G. MONRO, C.B.E., V.M.H.	Lord Aberconway	Major F. C. Stern
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As Auditor :

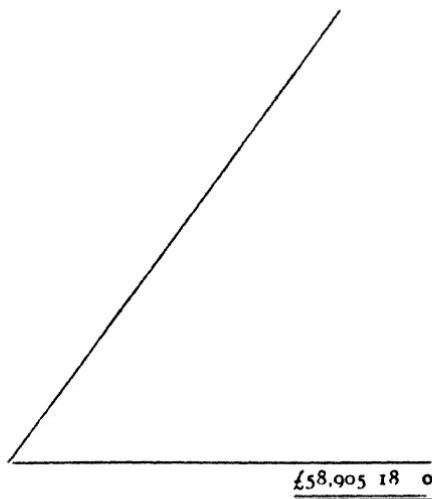
Mr. J. S. FEATHER, F.C.A..	The Hon. Lewis Palmer	Mr. T. Hay.
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By Order of the Council,
F. R. DURHAM,
Secretary.

December 30, 1939.

FOR THE YEAR ENDED 31st DECEMBER, 1939—continued. Cr.

	<i>£</i>	s.	d.
Brought forward . . .	58,905	18	0



£58,905 18 0

ROYAL HORTICULTURAL SOCIETY—

LIABILITIES.

	£	s.	d.	£	s.	d.
ACCUMULATED FUNDS ACCOUNT				250,000	0	0
LIFE COMPOSITIONS as at 31st December, 1938	15,760	10	0			
Less Fees paid by Fellows who have died during the year	178	10	0			
	<u>15,582</u>	0	0			
Add Life Compositions received during the year	425	5	0			
	<u>16,007</u>	5	0			
SUNDRY CREDITORS				4,316	1	6
SUBSCRIPTIONS IN ADVANCE				128	15	8
DEPRECIATION AND RENEWALS FUND				10,000	0	0
OLD AND NEW HALLS SINKING FUND	30,353	10	6			
Deducted <i>per contra</i>	30,353	10	6			
WEATHER INSURANCE FUND	3,000	0	0			
Transferred to Shows Contingency Fund	3,000	0	0			
SHOWS CONTINGENCY FUND				3,080	2	0
SUPPLEMENTARY PENSION FUND				5,018	11	6
DAME JULIA M. TILDEN LEGACY SUSPENSE ACCOUNT				500	0	0
MRS. A. C. CHARRINGTON LEGACY SUSPENSE ACCOUNT				500	0	0
MEMORIAL AND OTHER TRUST FUNDS—						
Balances of Income Accounts in the hands of the Society, as per Separate Schedule				350	12	10
GENERAL RESERVE—						
Balance as at 31st December, 1938	39,844	10	7			
Add Accumulated Tax refund (Net)	1,517	1	10			
Balance of Revenue and Expenditure Account, 31st December, 1939	8,646	8	7			
	<u>50,008</u>	1	0			
	<u>£339,909</u>	9	6			

I have audited the books from which the foregoing Accounts are compiled, and certify that they exhibit a true and correct statement of the position of the Society on the 31st December, 1939. In the total of Assets, £339,909 9s. 6d., are included Investments and Cash amounting in all to a total sum of £48,802 16s. 10d., representing Depreciation and other Funds.

BALANCE SHEET, 31st DECEMBER, 1939.

ASSETS.	£	s.	d.	£	s.	d.
OLD HALL, OFFICES, RESTAURANT, LIBRARY, AND EQUIPMENT AT COST	77,642	0	0			
NEW HALL, RESTAURANT AND EQUIPMENT AT COST 167,706	2	10	0			
	245,348	2	10			
Less Old and New Halls Sinking Fund <i>per contra</i>	30,353	10	6			
	214,994	12	4			
OLD AND NEW HALLS SINKING FUND INVESTMENTS AT COST—						
As at 31st December, 1938	26,175	16	7			
Additions during the year	3,366	0	0			
Cash awaiting investment	811	13	11			
	30,353	10	6			
(Market Value of Investments at 29th December, 1939, £27,773 9s. 3d.)						
FREELAND PROPERTY, WISLEY—						
At Cost, less amounts written off	13,105	2	11			
BOTANICAL MAGAZINE—						
Stock	100	0	0			
DEPRECIATION AND RENEWALS FUND INVESTMENTS AT COST	10,000	0	0			
(Market Value at 29th December, 1939, £9,664 16s. 5d.)						
SHOWS CONTINGENCY FUND INVESTMENTS AT COST.						
Formerly WEATHER INSURANCE FUND INVESTMENTS—						
As at 31st December, 1938	3,000	0	0			
Cash awaiting investment	80	2	0			
	3,080	2	0			
(Market Value of Investments at 29th December, 1939, £2,755 7s. 1d.)						
SUPPLEMENTARY PENSION FUND INVESTMENTS AT COST—						
As at 31st December, 1938	4,589	3	2			
Additions during the year	212	18	5			
Cash awaiting investment	216	9	11			
	5,018	11	6			
(Market Value of Investments at 29th December, 1939, £4,472 os. 9d.)						
DAME JULIA M. TILDEN LEGACY INVESTMENT AT COST	500	0	0			
(Market Value at 29th December, 1939, £502 5s. 2d.)						
MRS. A. C. CHARRINGTON LEGACY INVESTMENT AT COST	500	0	0			
(Market Value at 29th December, 1939, £482 4s. 6d.)						
GENERAL INVESTMENTS AT COST:						
As at 31st December, 1938	46,878	4	13			
(Market Value at 29th December, 1939, £44,425 1s. 3d.)						
WISLEY ADJUSTMENT ACCOUNT	386	16	1			
R.H.S. DICTIONARY OF GARDENING—						
Expenditure to date (in suspense)	444	3	2			
SUNDRY DEBTORS AND PAYMENTS IN ADVANCE	4,825	9	4			
CASH AT BANK AND IN HAND	9,722	16	9			
	£330,909	9	6			

J. S. FEATHER, F.C.A., Auditor
(HARPER, FEATHER & PATERSON, Chartered Accountants),
35 Great Tower Street, London, E.C. 3.

8th January, 1940.

Dr.

WISLEY GARDENS—REVENUE & EXPENDITURE

		£	s.	d.	£	s.	d.		
TO ESTABLISHMENT EXPENSES—									
Salaries and Wages		2,571	1	5					
Rates, Taxes and Insurances		467	3	10					
Miscellaneous, including Donations		1,110	3	2					
Annuities		137	0	0					
					<u>4,285</u>	8	5		
,, LABORATORY AND SCHOOL OF HORTICULTURE—									
Salaries and Wages		2,698	12	2					
Miscellaneous		104	16	7					
Depreciation		54	6	1					
					<u>2,857</u>	14	10		
,, GARDEN—									
Salaries and Wages		6,361	8	1					
Plant Distribution		1,029	0	3					
Miscellaneous		1,120	12	7					
Depreciation		306	12	6					
					<u>8,817</u>	13	5		
,, STAFF PENSIONS									
Less Contributions by Staff, as per Scheme		487	9	7					
		243	15	0					
					<u>243</u>	14	7		
						<u>£16,204</u>	11	3	
TO BALANCE, brought down									
							£12,939	9	7
,, SPECIAL EXPENDITURE—									
Decorations and Repairs—Laboratory and Buildings		462	13	11					
" " " Greenhouses		192	9	5					
					<u>655</u>	3	4		
						<u>£13,594</u>	12	11	

ACCOUNT FOR THE YEAR ENDED 31st DECEMBER, 1939. Cr.

	£ s. d.	£ s. d.
	981 1 10	
BY DIVIDENDS AND INTEREST . . .		
,, CONTRIBUTIONS TO FRUIT TRIALS, 1938-9—		
Ministry of Agriculture	400 0 0	
Worshipful Company of Fruiterers	26 5 0	
National Farmers' Union	68 2 0	
	494 7 0	
,, GARDEN—		
Sales and Miscellaneous Receipts	784 17 5	
Prepaid Distribution, Postages and Packing Fees	1,004 15 5	
	1,789 12 10	
,, BALANCE, carried down	12,939 9 7	
		£16,204 11 3
,, BALANCE, being Net Expenditure for the Year, carried to the Annual Revenue and Expenditure Account	13,594 12 11	
		£13,594 12 11

WISLEY GARDENS—BALANCE

LIABILITIES.

	£	s.	d.
ACCUMULATED FUNDS ACCOUNT	35.870	7	8
VINCENT SQUARE ADJUSTMENT ACCOUNT	386 16	1	
ENDOWMENT TRUST FUND	24,479 14	3	
DEPRECIATION AND RENEWALS FUND	9,435 7	0	

£70,172 5 0

SHEET, 31st DECEMBER, 1939.

ASSETS.	<i>f s. d.</i>	<i>f s. d.</i>
LABORATORY, DWELLING HOUSES, GLASS HOUSES, RANGES, ETC., AT COST		33.371 10 10
N.B.—The Hanbury Trust Estate is, under the Trust Deed, vested in the Society only so long as it is in a position to use it as an Experimental Garden. Accordingly the Ex- penditure thereon by the Society is an Asset only so long as the Gardens continue to be used by the Society.		
FUEL STOCK (valued by the Director)		145 18 9
PLANT, LIVE STOCK AND LOOSE EFFECTS (valued by the Director)—		
As at 31st December, 1938	1,850 7 11	
Add Purchases during the year	37 16 8	
	1,888 4 7	
<i>Less Depreciation of Garden and Laboratory Effects</i>	<i>110 18 7</i>	
	1,777 6 0	
LIBRARY—		
As at 31st December, 1938	862 16 3	
Additions during the year	99 11 11	
	962 8 2	
ENDOWMENT TRUST FUND INVESTMENTS AT COST .		24,479 14 3
(Market value at 29th December, 1939, £21,575 7s. 3d.)		
DEPRECIATION AND RENEWALS FUND INVESTMENTS AT COST—		
As at 31st December, 1938	9,185 7 0	
Cash awaiting investment	250 0 0	
	9,435 7 0	
(Market value of Investments at 29th December, 1939, £9,656 14s. 3d.)		
	£70,172 5 0	

I have audited the books from which the foregoing Accounts are compiled, and certify that they exhibit a true and correct statement of the position on the 31st December, 1939. In the total of Assets, £70,172 5s od., are included Investments and Cash, amounting to £33,915 1s 3d., representing Endowment and Depreciation Funds which are not available for the general purposes of the Society.

J. S. FEATHER, F.C.A., Auditor
(HARPER, FEATHER & PATERSON, Chartered Accountants),
35 Great Tower Street, London, E.C. 3.

8th January, 1940.

ROYAL HORTICULTURAL SOCIETY—TRUST

		Amount of Fund represented by Investments at Cost and Cash.	Income Balance in hand 31st Dec., 1938.
		£ s. d.	£ s. d.
1. ALFRED DAVIS TRUST FUND		1,049 9 2	nil
2. WILLIAMS MEMORIAL FUND		258 15 4	9 0 1
3. MASTERS MEMORIAL FUND		542 17 0	122 5 10
4. NICHOLSON MEMORIAL FUND		202 2 2	nil
5. SCHRÖDER PENSION FUND		557 14 6	6 6 8
6. LINDLEY LIBRARY TRUST		15,131 0 0 (a)	nil
7. SIR JAMES KNOTT TRUST		600 0 0	92 12 3
8. VEITCH MEMORIAL TRUST FUND		1,746 1 0	62 1 10
9. MOORE MEDAL TRUST		190 10 6	3 2 1
10. SEWELL MEDAL TRUST FUND		531 8 9	nil
11. MRS. SHERMAN HOYT PRIZE FUND		207 7 10	23 14 6
12. LORD RIDDELL TROPHY FUND		222 12 11	1 4
13. DEDICATIONS VOLUME FUND (Botanical Magazine)		227 4 7	nil
14. THE COLMAN FUND		1,248 1 7	nil
15. P. D. WILLIAMS FUND		372 7 9	20 9 2
16. THE GLAZEBROOK FUND		100 0 0	2 9 7
17. CORY BEQUEST TO LINDLEY LIBRARY		1,121 13 9	nil

Notes on above Funds :

1. Bequeathed to the Society in 1870 for annual prizes or any other object the Council may determine.
2. Raised by donations in 1891 in memory of the late Mr. B. S. Williams towards the provision of prizes and medals.
3. Raised by donations in 1908 in memory of the late Dr. Masters towards the provision of one or more annual lectures.
4. Raised by donations in 1908 in memory of the late Mr. Geo. Nicholson to provide prizes for Wisley students.
5. Provided by the Society in memory of the late Baron Schröder to pay to the Gardeners' Royal Benevolent Institution for one pension.
6. The nucleus of the library is the fine collection of books and pamphlets which belonged to the late Dr. Lindley. It has since been added to by the books purchased by the Society and by the gifts of the late Mr. Reginald Cory and of private donors.
7. Presented to the Society in 1920 by the late Sir James Knott for the purpose of providing a scholarship tenable at Wisley.
8. Instituted in 1870 in commemoration of the late Mr. James Veitch for the encouragement of Horticulture. Fund vested in Society in 1922.
9. Presented to the Society in 1926 by the late Mr. G. F. Moore to provide a medal annually for the best new Cypripedium shown to the Society during the year.

FUND ACCOUNTS, 31st DECEMBER, 1939.

Dividends and Interest received during 1939.	Expenditure in 1939 in accordance with the Trust.	Income Balance in hands of R.H.S. 31st Dec., 1939.	
£ s. d.	£ s. d.	£ s. d.	£ s. d.
43 17 10	43 17 10	nil	(a) Investment . 1,509 10 2
8 17 8	11 15 2	6 2 7	Cost of books pur- chased by the
20 0 0	29 9 8	112 16 2	Society up to
5 4 0	5 4 0	nil	31st Dec., 1938 13,264 14 4
20 0 0	20 0 0	6 6 8	Books purchased by the Society
602 19 0 (b)	602 19 0	nil	in 1939 . . . 356 15 6
25 3 0	30 0 0	87 15 3	
57 17 2	54 4 0	65 15 0	£15,131 0 0
7 16 6	9 10 8	18 11	(b) Includes contribution by the Society in 1939, £556 2s. 4d.
23 8 11	20 8 9	3 0 2	(c) Income added to Fund and awaiting Investment.
10 8 1	1 0	34 0 10	(d) Income added to Fund and awaiting Investment.
5 19 0	nil	6 0 4	
5 19 1 (c)	5 19 1	nil	
32 13 11 (d)	32 13 11	nil	
10 19 5	9 7 6	22 1 1	
3 6 3	nil	5 15 10	
nil	nil	nil	
Total as per Balance Sheet		£350 12 10	

10. Presented to the Society in 1928 by the late Mr. A. J. Sewell to provide medals for Rock Garden Plants.

11. Presented by Mrs. A. Sherman Hoyt in 1929 as a donation and funded by the Society to provide prizes for the encouragement of the growth of Cacti and Succulents.

12. Presented by the late Lord Riddell in 1931 to provide a trophy annually to be awarded for vegetables.

13. Proceeds of the sale of Curtis's Botanical Magazine Dedication, 1827-1927, presented in 1932 to the Society by the late Mr. William Cuthbertson, V.M.H., to be devoted to publications.

14. Presented to the Society in 1935 by Sir Jeremiah Colman, Bt., V.M.H., to be used for the improvement of flowers or fruit.

15. Raised in 1936 by donations to provide medals to commemorate the late Mr. P. D. Williams and to encourage the cultivation and improvement of Daffodils and Rhododendrons. In 1937 the Society made a grant of £75 to cover the cost of medal design and dies.

16. Bequeathed to the Society in 1938 by the late Mr. H. de T. Glazebrook to provide prizes at the Society's shows.

17. Proceeds of the sale of duplicate books being part of the bequest of the late Mr. Reginald Cory to the Lindley Library (referred to under No. 6), held, in cash for the time being, in trust by the Society for the purchase of further books.

Indian Agricultural Research Institute (Pusa)

LIBRARY, NEW DELHI-110012

This book can be issued on or before-----

Return Date	Return Date